

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

# DIESEL PROGRESS

INCORPORATING  
GAS TURBINE  
PROGRESS



FIVE DOLLARS PER YEAR

JUNE 1959

FIFTY CENTS PER COPY

# Decision made 21 years ago proved to be the right one

*Garnett, Kansas Light Plant  
in 1938, selected  
Standard Oil  
diesel lubricant*

**Situation:** In 1938, when Garnett, Kansas put two diesel engines (one 600 hp and one 1000 hp) into service, plant management selected a Standard Oil diesel lubricant. In 1948, when a 1400 hp engine was added, the performance from the Standard lubricant caused management to make the same choice. In 1955, when a 2100 hp dual fuel unit was placed in service, STANODIESEL Oil M was chosen.

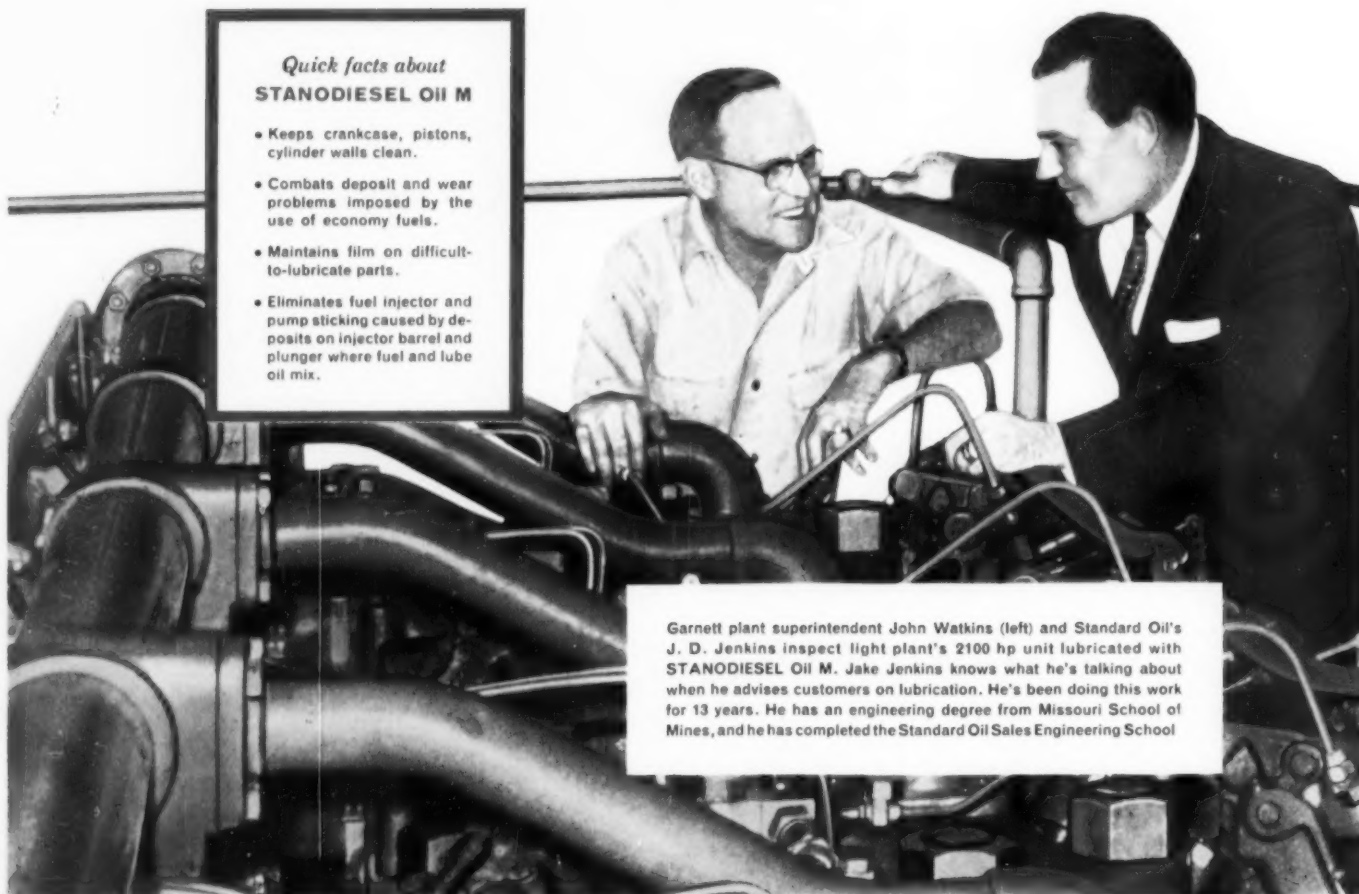
**What has happened:** At the Garnett plant, stuck rings and dirty pistons are unknown. The 1400 hp unit was in service nine years before reringing. Overhauls are made only every five years. The top performance from STANODIESEL Oil M and the technical service provided by lubrication specialist, J. D. Jenkins, have made possible first rate, uninterrupted, low cost electric service.

**What you can do:** The Standard Oil salesman near you in any of the 15 Midwest or Rocky Mountain states has the full story about STANODIESEL Oil M, and how it will perform for you. Call him. Or write, **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.**

You expect more from  and you get it!

## **Quick facts about STANODIESEL OIL M**

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by the use of economy fuels.
- Maintains film on difficult-to-lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.



Garnett plant superintendent John Watkins (left) and Standard Oil's J. D. Jenkins inspect light plant's 2100 hp unit lubricated with STANODIESEL Oil M. Jake Jenkins knows what he's talking about when he advises customers on lubrication. He's been doing this work for 13 years. He has an engineering degree from Missouri School of Mines, and he has completed the Standard Oil Sales Engineering School

# More horsepower for the new Caterpillar D8 tractor



AIRESEARCH  
T-1404  
TURBOCHARGER

*Turbocharger system specifically  
designed for big Series H tractor*

A joint development of Caterpillar and AiResearch, the turbocharger system is an integrated part of the new D8 Series H tractor. Extensive field tests showed an increase of 20% in bulldozing and a substantial gain in pushloading production with the Series H...brought about by the

tractor's greater horsepower, faster torque rise, greater weight and faster dozing and reverse speeds.

Specifically designed to match the new tractor's requirements, the new turbocharger underwent thousands of test hours on the new D8 operating in every kind of material on every kind of job.

AiResearch turbocharger advantages include: increased horsepower, improved lugging ability, cooler exhaust temperatures, reduced maintenance costs, less smoking and noise. This is another application of AiResearch turbochargers to heavy industrial machinery.



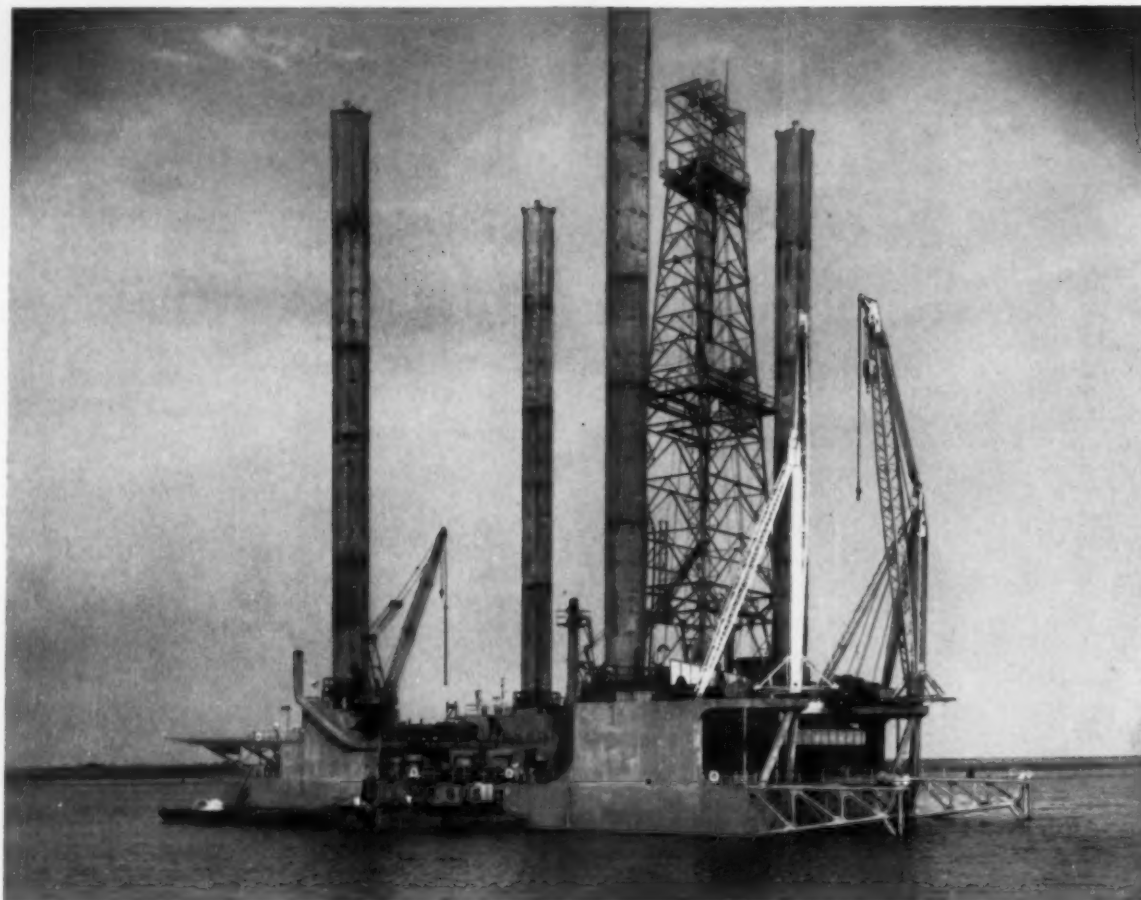
AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



## FROM GENERAL MOTORS...TEMPERATURES MADE TO ORDER



**20 HARRISON-COOLED DETROIT DIESEL ENGINES PROVIDE 5,000 H.P. FOR MR. GUS II—WORLD'S MOST POWERFUL OFFSHORE DRILLING RIG!**



Harrison heat exchangers are rugged, reliable and compact—engineered and built to General Motors standards of quality.



Drilling for oil in 150 feet of water is a powerful assignment—but MR. GUS II handles it with ease! And Harrison heat exchangers are on the job, keeping a close check over engine oil temperatures on this giant Diesel-powered drill rig. Harrison heat transfer equipment provides optimum cooling efficiency and economy even under the heaviest loads and continuous operating assignments. These products—backed by over 48 years' experience in the heat-control field—are found in every line of industry and defense. If you have a cooling problem, look to Harrison for the answer.



AIRCRAFT, AUTOMOTIVE, MARINE AND INDUSTRIAL HEAT EXCHANGERS



HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK



# DIESEL PROGRESS

INCORPORATING  
GAS TURBINE  
PROGRESS

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IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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DIESEL PROGRESS for June, 1959, Vol. XXV, No. 6. Published Monthly by Diesel Engines, Inc., 1701 W. Wisconsin Ave., Milwaukee 3, Wisc. Phone DIvision 4-5355. Subscription rates are \$5.00 for U.S.A. and possessions. All other countries \$7.50 per year. Subscriptions may be paid the London Office at £2-12s-6d per year. Accepted as Controlled Circulation Publication at Long Prairie, Minnesota.

DIESEL PROGRESS is indexed regularly by Engineering Index, Inc. and is available in microfilm editions from University Microfilms, Inc., Ann Arbor, Michigan.

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### EXECUTIVE OFFICES

816 N. La Cienega Blvd.  
Los Angeles 46, Calif.

### EDITORIAL OFFICES

1701 W. Wisconsin Ave.  
Milwaukee 3, Wisc.

### BUSINESS OFFICES

MILWAUKEE 3:  
Bruce W. Wadman  
1701 W. Wisconsin Ave.  
Division 4-5355

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### FIELD EDITORS

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Edwin Dennis  
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TUxedo 8-2188

LOS ANGELES 46:  
James Joseph  
8421 Melrose Ave.  
OLive 3-4542

HOUSTON 18, TEXAS  
Donald M. Taylor  
1345 Chamboard Lane  
OVerland 6-1127

PORT LAVACA, TEXAS:  
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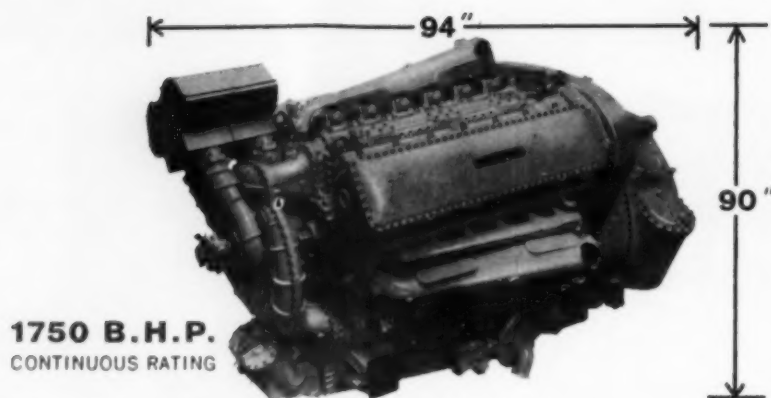
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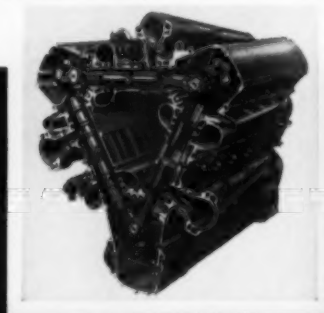
### FRONT COVER ILLUSTRATION

The M/V Arthur K. Atkinson, first diesel railroad carferry on the Great Lakes, leaves her Manitowoc dock. Repowered with two 2550 hp Nordberg engines, vessel has increased speed 50 per cent. See story beginning page 35.

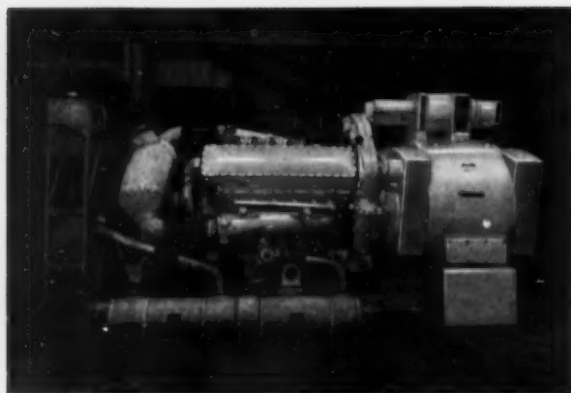


# **NOW...THE NAPIER DELTIC 9- AND 18-CYLINDER DIESELS PROVIDE THE HIGHEST POWER/WEIGHT RATIO IN THEIR CLASS!**

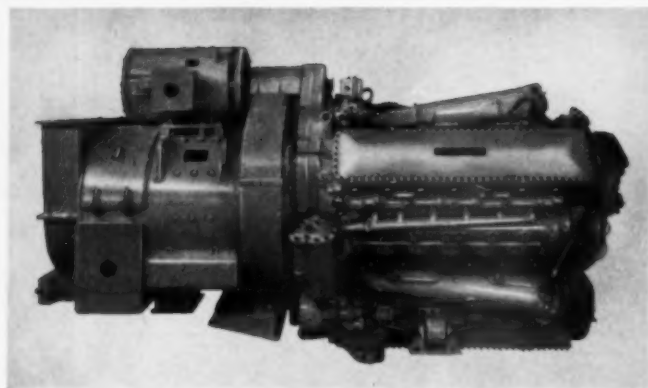
*FOR INDUSTRIAL, MARINE, AND TRACTION APPLICATIONS*



Basic triangular design of Napier Deltic water-cooled, opposed-piston, two-stroke Diesel engines. Eliminates vibration.



Stationary power unit: 1200 kw. peak load and emergency power plant for industry, auxiliary power for cargo carriers. Lack of vibration eliminates heavy-duty foundations.



Mobile power unit: Napier Deltic 18-cylinder engine, as used in 1200 kw. generating set. Lightweight makes for easy portability.

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OFFERS YOU:**

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and low weight
- Low specific fuel consumption
- Ease of maintenance
- Simplified stocking of spare parts
- Mechanically aspirated  
or turbo-charged

**NAPIER DELTIC BASIC  
ENGINE DATA:**

*Power: 860 to 3100 BHP...  
depending on model*

*Weight: 7000 to 13000 lbs. ...  
depending on model*

*Maximum Width: 65 inches*

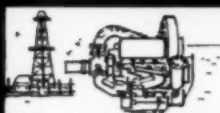
*Maximum Height: 90 inches*

More detailed data is available on the Napier Deltic engine and its many applications. Just write to: Napier Engines, Inc., 909 Dupont Circle Building, Washington 6, D.C. In Canada, write to: D. Napier & Son, Ltd., 4104 St. Catherine St., West, Montreal, P.Q.

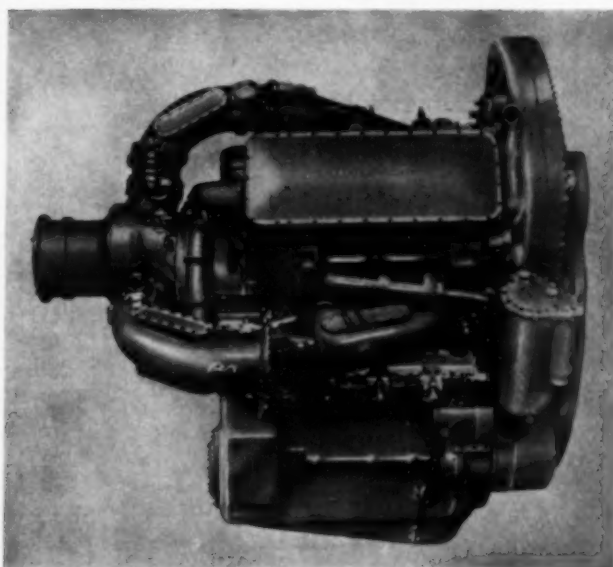
# **-NAPIER-**

**ENGINES INCORPORATED**

A SUBSIDIARY OF D. NAPIER & SON, LTD., LONDON, ENGLAND • A MEMBER OF THE ENGLISH ELECTRIC GROUP OF COMPANIES



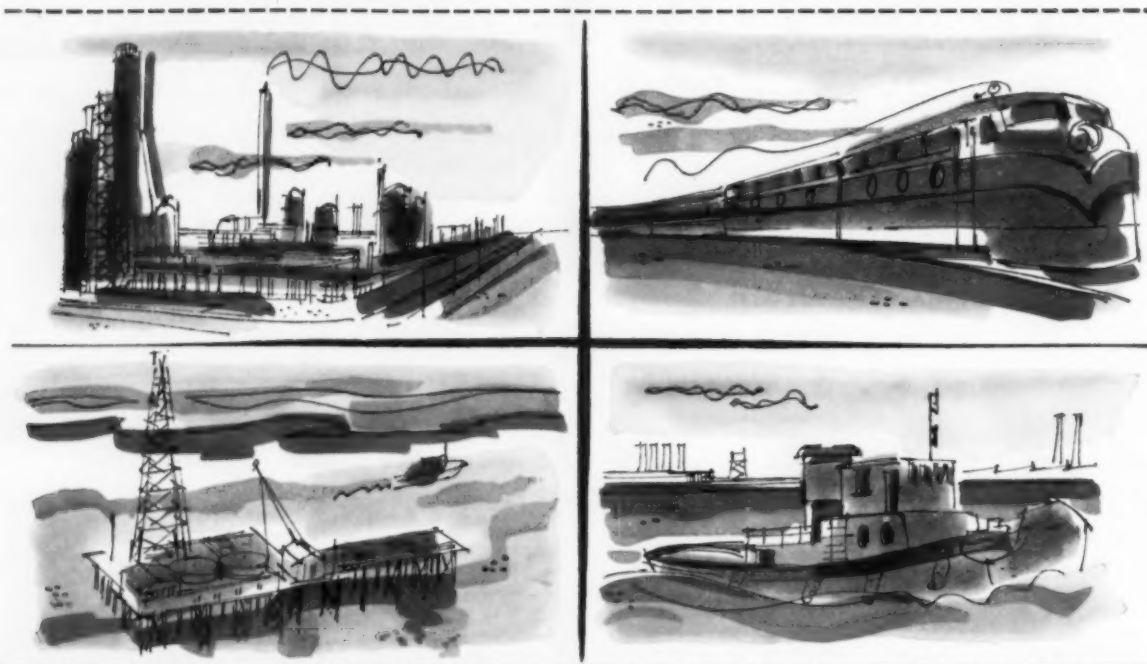
For mobile generating, pump, and compressor sets: A turbo-charged 9-cylinder Napier Deltic ... continuous power at 1100 BHP.



Small coastal vessels: 2 Napier Deltics with a continuous rating of 3300 BHP. For tugboats, harbor and coastal craft.







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Since the first diesel engine, Koppers has produced piston rings of predictable performance in a complete range of materials and a wide selection of types and sizes. If you have a ring problem, Koppers can offer you the benefit of their experience. Write to: KOPPERS COMPANY, INC., Piston and Sealing Ring Department, 4206 Hamburg Street, Baltimore 3, Maryland.

*Send now for Koppers recommended Piston Ring Set-Ups applicable to the engines which you operate.*



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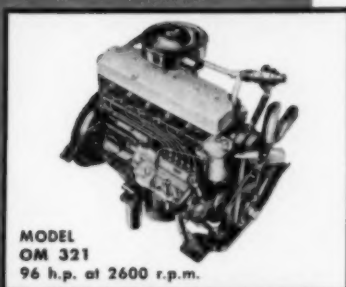
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## DIESEL ENGINES

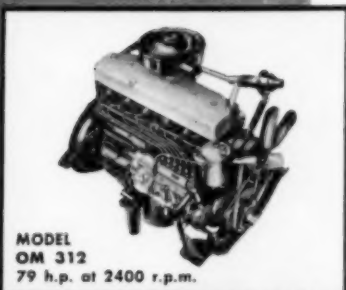


**5 DECADES OF  
DIESEL LEADERSHIP**

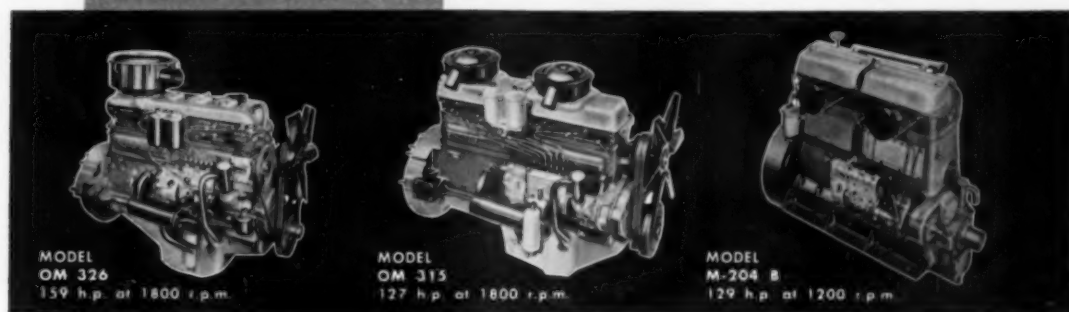
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- INDUSTRIAL
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- CONSTRUCTION
- PETROLEUM
- AGRICULTURAL POWER



MODEL  
OM 321  
96 h.p. at 2600 r.p.m.



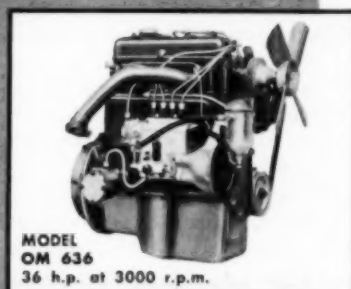
MODEL  
OM 312  
79 h.p. at 2400 r.p.m.



MODEL  
OM 326  
159 h.p. at 1800 r.p.m.

MODEL  
OM 315  
127 h.p. at 1800 r.p.m.

MODEL  
M-204 B  
129 h.p. at 1200 r.p.m.



MODEL  
OM 636  
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Feature for feature, Mercedes-Benz diesel engines offer more—lightweight, economy, performance and dependability . . . All models are 4-cycle, liquid-cooled, and utilize the patented pre-combustion chamber and Robert Bosch injection pumps and nozzles . . . Horsepowers range from 36 to 3000, with a weight to h.p. ratio as low as 4 pounds . . . Mercedes-Benz diesel engines bring to users unmatched performance, quality and workmanship . . . Either heat exchanger or radiator cooled models available to meet all installation requirements.

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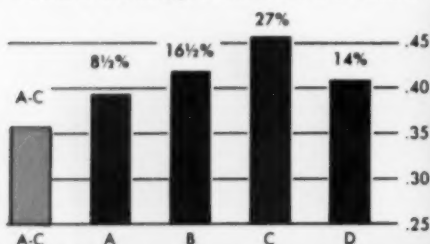
*We Told You They Were  
Good, BUT THEY'RE  
BETTER THAN WE SAID!*

Actual field performance now proves that the new Allis-Chalmers 21000 and 16000 are *even better* than we announced. This fuel consumption chart illustrates the big advantage they give you in economy and efficiency, but it doesn't say enough.

### FUEL CONSUMPTION

Pounds per brake hp hr.

Percent of fuel savings with A-C over other diesels



6 cylinders

21000

340 hp  
Turbocharged

16000

230 hp

Every day, reports from users prove that

our original claims were understatements. Here are a few examples:

"Man, what Power — a lot more than we ever expected," reports a construction company spokesman. "These engines have really got it!"

"'Startingest' engine we've ever had," says a northern cement producer. "We threw away the ether can with temperatures way down below freezing — no external heating either."

"We can hardly believe the fuel economy, and it's doing heavy work, too," states a contractor. "Cleanest running engine we've ever seen."

BE-14

"Wish we had this engine in all our equipment," says a midwestern user. "We're doing a good 25 percent more work with it — on the same amount of fuel. It's almost unbelievable!"

Greater economy, top usable power, superior starting, plus a cleaner, tougher, more serviceable design — these will put more profit in performance on your job.

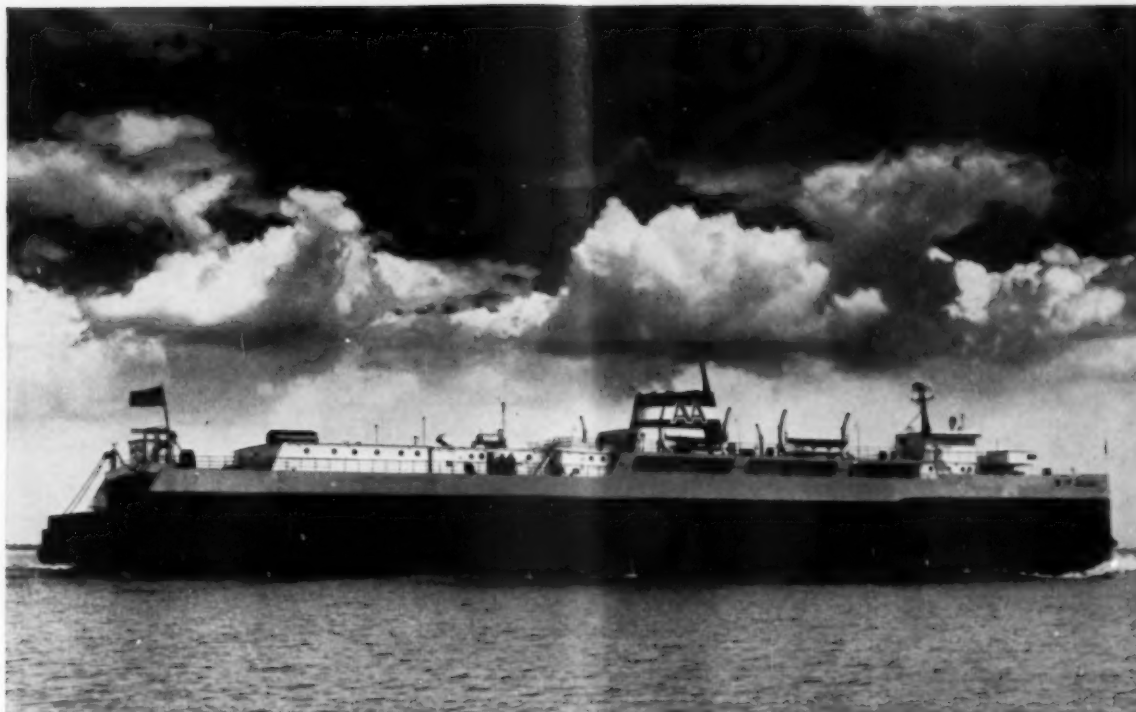
**Power your equipment with these new engines.**

For full details, see your dealer or write for bulletin BU-540. Allis-Chalmers, Milwaukee 1, Wisconsin.

**ALLIS-CHALMERS**  
POWER FOR A GROWING WORLD







The M/V Arthur K. Atkinson, first diesel-propelled railroad ferry on the Great Lakes.

## BENDIX FUEL INJECTION HELPS POWER FIRST DIESEL CAR FERRY ON GREAT LAKES

The M/V Arthur K. Atkinson, now in daily service between Frankfort, Michigan, and Kewanee and Manitowoc, Wisconsin, is the first diesel railroad car ferry to operate on the Great Lakes. The 43-year-old lake veteran was recently completely renovated and fitted with two 2550-hp Nordberg marine diesels with Bendix® Diesel Fuel Injection equipment.

Her speed increased by a full 50 per cent, the Atkinson (formerly the Ann Arbor No. 6) is named after the president of the Wabash Railroad, owner of the ship line. Her last trip under steam—she was powered by two triple expansion steam engines—was made in June of 1958. Since lengthened by 34 feet and with superstructure and deckhouses elevated by 24 inches, she now has a capacity of 28 loaded rail cars, considerably greater than her earlier capacity.

There is a good reason why the two Nordberg turbocharged marine diesels driving controllable pitch propellers are equipped with Bendix Diesel Fuel Injection. The ability of Bendix Fuel Injection to meet the highest performance standards has been repeatedly proved. That's why more diesel engine manufacturers are specifying Bendix than ever before in history.

\*REG. U.S. PAT. OFF.

Export Sales & Service: Bendix International Division, 205 E. 42nd Street, New York 17, N. Y.



Below decks on the Atkinson, a view of the Nordberg diesels equipped with Bendix Fuel Injection equipment.



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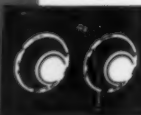
**COOK OIL CONTROL RING, TYPE 363-BCK** — Will conform to shape of cylinder whether surface is true or out of round. Features lifetime coil spring. Most copied oil control ring in the world.



**TYPE 301-1X** — This is a double-acting full sealing ring that is actuated by a coil spring and has complete flexibility to ensure perfect cylinder contact even in worn cylinders.



**COOK SEGMENTAL RING, TYPE 104** — Consists of three or more outer segments with step-cut joints actuated by a flat inner steel expander. Provides efficient seal on both cylinder and groove.



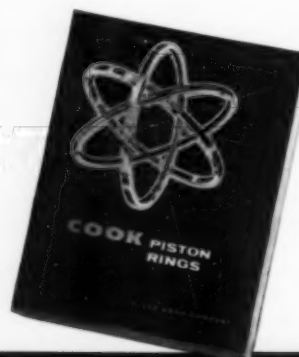
Look to **COOK**  
for Better Rings!

## See the complete line in Cook's new PISTON RING CATALOG

Whatever your piston ring requirements — Plain, Full Sealing, Segmented or Oil Wiper — there's a job-engineered Cook ring to fill the bill.

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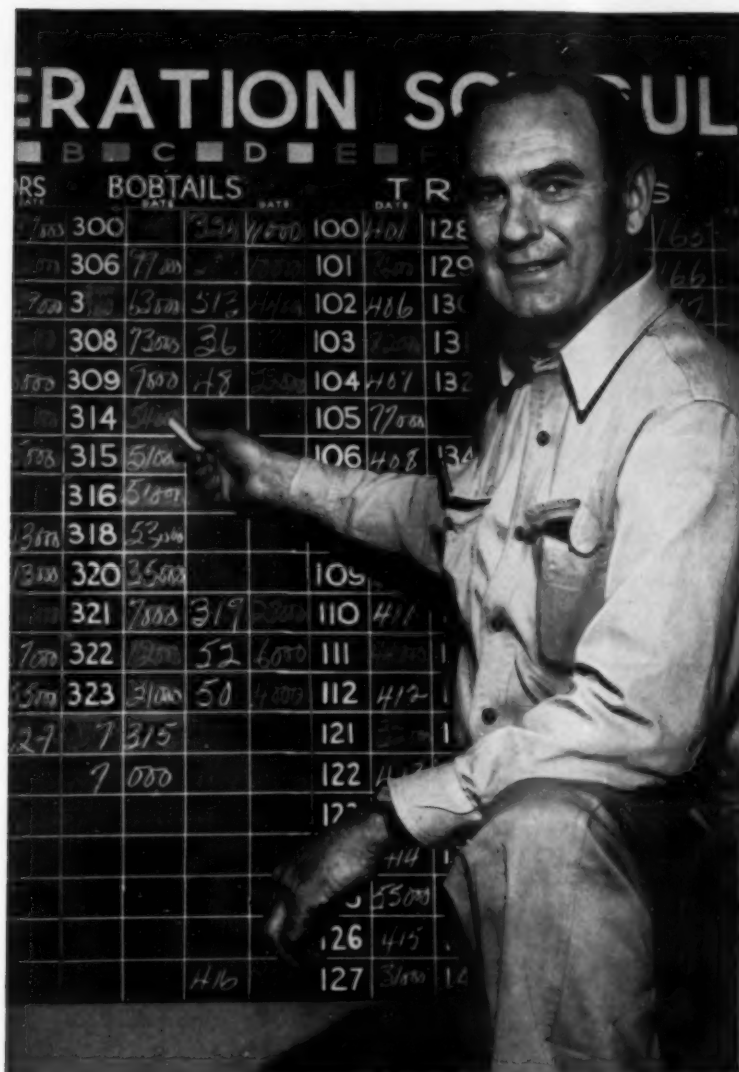
## ENGINEER'S FIELD REPORT

PRODUCT	RPM DELO Oil
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STERLING TRANSIT CO.

**FIRM** Montebello, California

## 350,000 miles on RPM DELO before rebuilding



**Using RPM DELO Oil**, Sterling Transit Co.'s 15 diesel tractors run an average of 250,000 miles before overhaul. "In fact, we get 350,000 to 400,000 miles out of them before engines are removed for rebuilding," reports Maintenance Manager Bill Schuster (above). "Regular oil changes are an important part of our preventive maintenance program. This color-coded chart indicates the mileage and condition of any unit in our 82-truck fleet...and these records show that RPM DELO Oil is doing a good job."



STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20  
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey



**800-mile round trip** between Oakland and Los Angeles is regular run for firm's big Kenworths and Internationals. Mr. Schuster makes frequent dipstick checks (above), reports make-up RPM DELO Oil for trip averages only 5 quarts. Older trucks use cleanable filters; newer units, replaceable cartridges. All use RPM DELO Oil exclusively.

## Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming.

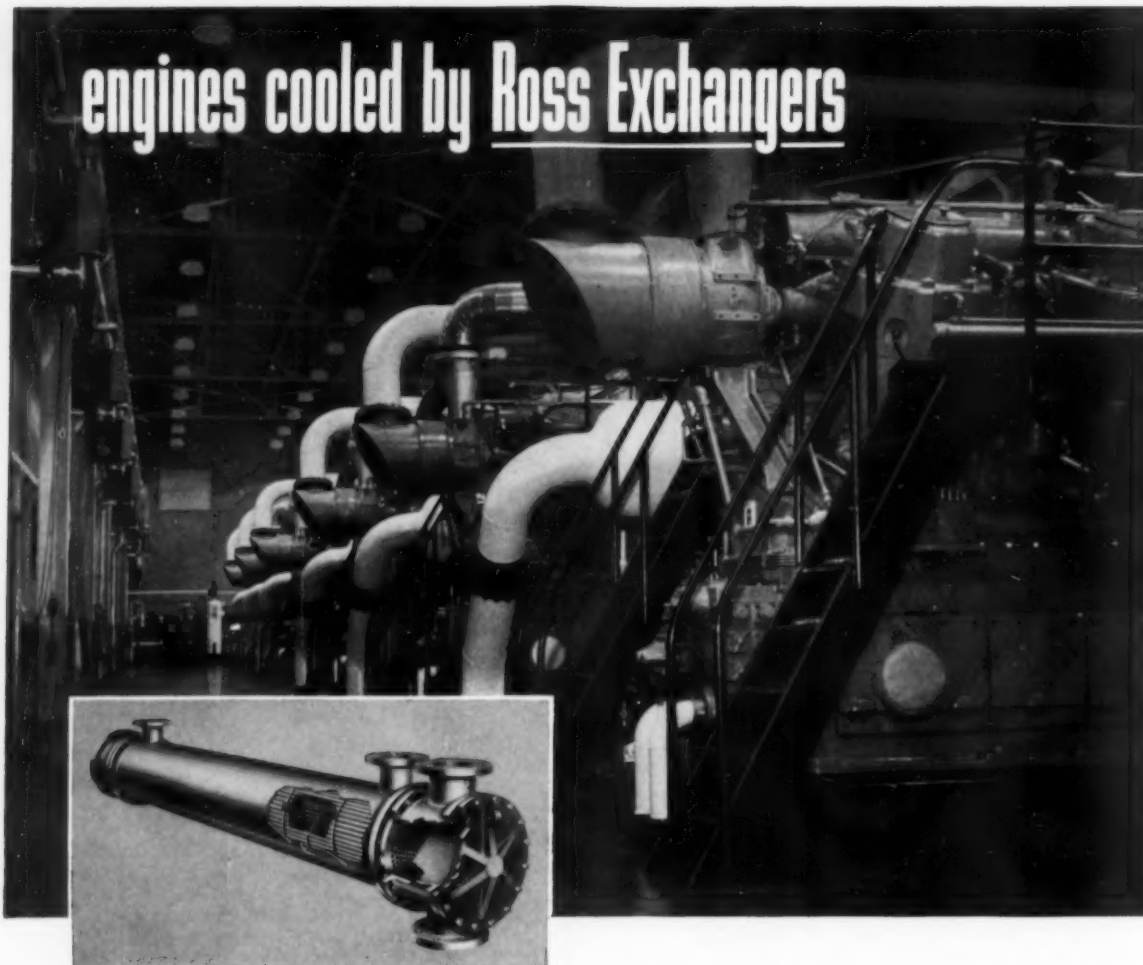


**For More Information** or the name of your nearest distributor, write or call any of the companies listed.

**STANDARD OIL COMPANY OF TEXAS, El Paso**  
**THE CALIFORNIA COMPANY, Denver 1, Colorado**



## engines cooled by Ross Exchangers



### six I-R Compressors start natural gas on its trek through Canada's Big Inch

TAYLOR, BRITISH COLUMBIA — It's 35 below zero at Compressor Station No. 1, the starting point for Canada's Big Inch. Only the powerful hum of six 2000 hp Ingersoll-Rand, gas engine driven compressors, cracks the still, sub-arctic air.

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Versatile and compact, they meet a wide variety of oil, water, gas and air cooling requirements. Today, Ross Exchangers circle the Earth . . . possibly one day soon, the moon.

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or gas turbines — Here is important  
information for you!

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4. **ACCESSORY EQUIPMENT** — Recent developments in fuel injection systems, governors, and other key accessory units are detailed and illustrated fully in this section.
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Rockwell-Standard's Hydra-Drives units make hard work easy for heavy-duty equipment. The result . . . smooth, efficient, economical operation. A torque converter and 4-speed transmission in one compact package, the Hydra-Drives Power Shift Transmissions have been proved in hundreds of vehicles. They eliminate engine lugging and heavy shock loads. A 3-to-1 torque multiplication makes starting fast and effortless—even with heaviest loads.

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Hydra-Drives Torque Converters are the simplest, most efficient made. They can be matched with any transmission for easier, more efficient operation.



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- Four speeds forward and reverse.
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- For equipment up to 250 h.p.

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- Full power shifting.
- For equipment up to 175 h.p.



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- 3-to-1 torque multiplication.
- Available separately, or with Hydra-Drives Transmission.
- For vehicles up to 500 h.p.



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- Shell Tellona R Oil 40**—anti-wear crankcase oil for diesel locomotives
- Shell Alvania Grease**—multi-purpose industrial grease
- Shell Turbo Oils**—for utility, industrial and marine turbines
- Shell Dromus Oils**—soluble cutting oils for high-production metalworking
- Shell Mocomo Oils**—for extreme pressure industrial gear lubrication
- Shell Valuta Oils**—for high-speed quenching with maximum stability

### Its performance and name are the same around the world

Shell Rimula Oil is available to your customers abroad. They can depend upon it for the most severe conditions of diesel operation.

Rimula® Oil is a heavy-duty oil designed to solve the toughest lubricating problems in diesel engines.

One of these problems—excessive cylinder and ring wear—results from acidic combustion products. It occurs under all operating conditions, but is especially severe under low jacket temperatures. Rimula Oil contains an alkaline additive that counteracts this

acid wear. It remains stable under the widest temperature extremes encountered in modern diesel operation. It keeps engine parts clean and operating efficiently over longer periods . . . effecting worth-while savings in labor and parts.

For full information, write Shell Oil Company, 50 West 50th Street, New York 20, N.Y., or 100 Bush Street, San Francisco 6, California. In Canada: Shell Oil Company of Canada, Limited, 505 University Avenue, Toronto 2, Ontario.

**SHELL RIMULA OIL**  
*the heavy-duty crankcase lubricant*



## SPICER 4-SPEED AUXILIARY TRANSMISSION



## A deep underdrive *plus* a splitter for a faster pull up any grade

Now . . . with the Spicer 4-speed auxiliary transmission . . . you can equip your vehicles with the right ratio for every grade, whether on or off the highway.

In the same dual-purpose gearbox, there's a deep underdrive — for added pulling power — and a splitter ratio that speeds up the long pull. As a further advantage, the use of the splitter gear avoids engine lugging under almost any condition and makes it easier to keep engine RPM in the most efficient range for greater fuel economy.

For convenience in gearing up, the Spicer 4-

speed auxiliary is directly interchangeable with present 3-speed auxiliary transmissions. Companion flanges, drive shaft length and shift lever controls can all remain the same.

As an added option, the 4-speed transmission is offered with a top-mounted power take-off capable of transmitting full engine torque. Or, where lightweight design is desired, you can order the Spicer 4-speed transmission with an aluminum case . . . saving 80 lbs. of weight.

For further specifications, write the Dana Corporation, Toledo 1, Ohio, and mention the vehicle you're planning to gear up.



### DANA CORPORATION • Toledo 1, Ohio

#### DANA PRODUCTS Serve Many Fields:

**AUTOMOTIVE:** Transmissions, Universal Joints, Propeller Shafts, Axles, Power-Lok Differentials, Torque Converters, Gear Boxes, Power Take-Offs, Power Take-Off Joints, Clutches, Frames, Forgings, Stampings.

**INDUSTRIAL VEHICLES AND EQUIPMENT:** Transmissions, Universal Joints, Propeller Shafts, Axles, Gear Boxes, Clutches, Forgings, Stampings.

**AVIATION:** Universal Joints, Propeller Shafts, Axles, Gears, Forgings, Stampings.

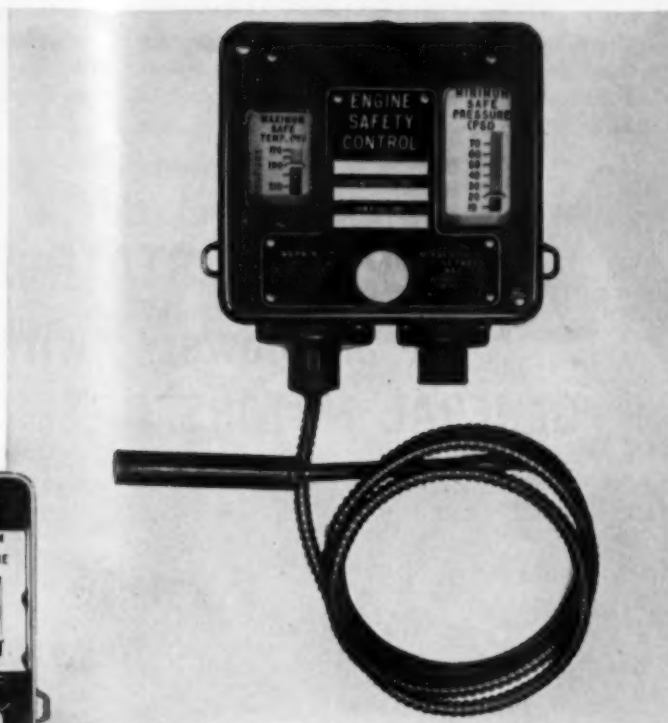
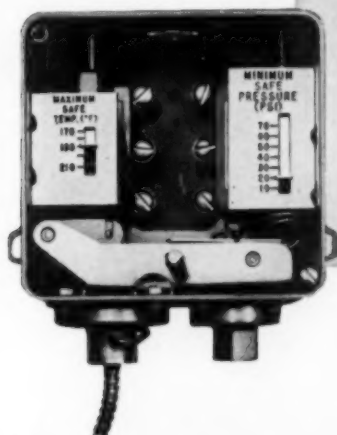
**RAILROAD:** Transmissions, Universal Joints, Propeller Shafts, Generator Drives, Rail Car Drives, Pressed Steel Parts, Traction Motor Drives, Forgings, Stampings.

**AGRICULTURE:** Universal Joints, Propeller Shafts, Axles, Power Take-Offs, Power Take-Off Joints, Clutches, Forgings, Stampings.

**MARINE:** Universal Joints, Propeller Shafts, Gear Boxes, Forgings, Stampings.

Many of these products manufactured in Canada by Hayes Steel Products Ltd., Merrilton, Ont.

Temperature and pressure set points are inside the case, protected against accidental manipulation. Cover is removed for easy adjustment.



## ***NEW*** Diesel engine safety switch ...gives fail-safe protection

This all-new Honeywell safety switch responds to abnormal pressure or temperature to stop or idle a diesel engine, or actuate an alarm circuit.

It combines separate systems for measuring engine coolant temperature and lubricating oil pressure. The temperature system includes an exclusive fail-safe feature, so that in case of damage to its temperature bulb, capillary or diaphragm, the switch responds as it would to excessive temperature.

Temperature and pressure settings can't drift off set points. There can be no false shutdowns due to vibration. Set points are easily adjustable in the field.

Your nearby Honeywell field engineer will be glad to give you complete information about the new Diesel Engine Safety Switch. Call him today . . . he's near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

● REFERENCE DATA: Write for Specification sheet S1010-5 "Diesel Engine Safety Switch."

# Honeywell



*First in Control*



## West Coast News

By James Joseph

TO Associated Grocers, Spokane, eleven McGraw-Edison "TropicAire" refrigeration units (powered by Continental ZD-129 diesels, rated 34 hp). Units chill dual compartments of single trailer thru one evaporator, holding one compart-

ment at zero-and-below for frozen foods, the other between 30-50° F for chilled commodities.

STOCKTON, Calif.'s Eggleston Towing Co. has taken delivery of a Caterpillar D311 diesel electric set producing 20 kw at 1200 rpm, to provide light and power for tow boat. Sale by N C Machinery Co., Seattle.

SOLD to Potlatch Forests, Inc., Lewiston, Ida., eight Model DAS-844 Allis-Chalmers diesels to repower ENO8D Mack trucks.

E. A. IRISH, Los Angeles contractor, has taken delivery of a Model 599-T American Hoist & Derrick Co. mobile crane, powered "upstairs" by a Model NHC-4-IP Cummins diesel.

TO General Services Administration, Seattle, a model 6DAS-844 with 16-inch Torcon converter, repowering a model 250-3 American Hoist & Derrick unit, with Young heat exchanger.

WORKING Los Angeles land-leveling project: three giant \$125,000 Le Tourneau, powered-wheel earthmovers electrified by Cummins VT-12 diesel generating sets. Contractor is Carl G. Malcolm & Co., Inc.

TO Lewiston, Idaho's Potlatch Forests Inc., a "21000" series Allis-Chalmers engine rated 340 hp at 2000 rpm with 8041 main box and 8341 progressive type, 4-speed transmission. Sale by Hamilton Engine Sales, Inc., Portland.

REPLACING gasoline engine in a Mack crane truck (owned by Los Angeles' Smith Brothers Trucking Co.) is a Cummins 200 hp Model NH-6-B, first diesel for this long-time rigging-moving firm.

DELIVERED to Los Angeles County by Essick Machinery Company, five Model 315 Worthington air compressors powered by Cummins NHC-4-BI engines . . . for use in county prison camps.

INSTALLED at City of Long Beach's waterflooding plant, eight White Superior Model 8G-825 gas engines rated 500 hp at 862 rpm, driving pumps thru speed reducers.

ELEVEN western states distribution for M-A-N M-type "whispering" diesel engines (particularly in farm tractor applications) has been awarded to MAN-Pacific, a division of Wilbo Industries, Wilmington, Calif.

TO N. Fiorito Co., Inc., Seattle, a 2-cycle GM Model 3031C fan-to-flywheel unit, rated 89 bhp at 2000 rpm . . . to power water pump.

DELPEN Co., Seattle, has taken delivery of twin 6-71 GM diesel marine engines with 4-valve head for installation in their freight boat, *Delpen*, operating Seattle-Alaska route. Sale by Seattle's Modern Motors, Inc.

J. O. ERISMAN, Lopez, Wash. has installed his Alaska-fishing *Lady Nina* with a 2-cycle GM marine model 3072, rated 68 cont. at 1800 rpm.

SOLD to City of Juneau, Alaska, for installation in an Oshkosh Snow Plow, a 2-cycle GM Model 4057C fan-to-flywheel diesel, rated 143 at 2100 rpm.

AS barge-mounted power unit supplying lumber camp at Sitka, Alaska Lumber & Pulp Co., Sitka, has purchased a 2 cycle GM Model 4150 radiator-cooled

# NOW 7 WASHINGTON STATE FERRIES are powered with GENERAL MOTORS DIESEL ENGINES



The EVERGREEN STATE powered with two 16-cylinder General Motors Diesel engines

The seven Washington State ferries, powered with General Motors Diesels, have an established record of dependability. They all operate on regular schedules in Puget Sound. Two of the boats, the EVERGREEN STATE and the ILLAHEE operate on the Seattle to Winslow route . . . a distance of 8 miles . . . on a 45-minute, turn-around schedule.

General Motors Diesels have established an outstanding record in every type of marine propulsion. Specify General Motors Diesels for your next marine installation.

A GOOD PRODUCT PLUS GOOD SERVICE GIVES TOP PERFORMANCE

## CLEVELAND DIESEL

Engine Division of General Motors • Cleveland 11, Ohio

SALES AND SERVICE  
OFFICES:

Chicago, Ill.  
New Orleans, La.

New York, N. Y.  
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Portland, Ore.  
St. Louis, Mo.

San Diego, Calif.  
San Francisco, Calif.

Seattle, Wash.  
Wilmington, Calif.

generator set, 80 kw intermittent, rated 143 bhp at 2100 rpm.

SOLD to Phoenix, Arizona's Superlite Builders Supply Co., a Cummins NH-220 for repowering an Autocar DC-10464. Sale by Cummins Arizona Diesel, Phoenix.

DISTRIBUTION change: Seattle's Evans Engine & Equipment Co., Inc. has established a subsidiary, Modern Motors, Inc., which handles its GM diesel engine products while parent company specializes in heavy equipment.

SOLD to R. A. Wattson Co., North Hollywood, Calif. contractors, a 5 hp LD-1 Lister, operating a pump diaphragm. Sale by Industrial Engine Service Co.

TO Irving W. Brooks, Chino, Calif., a Minneapolis-Moline model 425 engine, rated 85 hp at 1740 rpm, for powering a Gradall excavator.

#### Western Gear Names Barnett

The Fred E. Barnett Co. with offices at Eureka and Ukiah, Calif. has been appointed distributor for Western Gear Corporation's StraitLine reducers and gearmotors. The Barnett company is well established in the power transmission equipment field and will sell Western Gear StraitLine gearmotors and reducers. Announcement of the new distributorship was made by Ed Jenks, sales manager of the Industrial Products Division of Western Gear which headquarters at Belmont, Calif. Mr. L. W. Hinds is manager of the main store in Eureka, and Leonard Johnson is manager of the Ukiah branch.

#### Allis-Chalmers Engine Catalog

Design, construction and mechanical advantages of the two recently introduced Allis-Chalmers power plants . . . the 21000 and the 16000 diesel engines, are described in a new 16-page catalog now available from the Engine-Material Handling Division, Allis-Chalmers Manufacturing Co., Milwaukee, Wis. The new catalog, BU-540, is complete with many illustrations, including charts, graphs and a cutaway view of the engines, to visually describe the new units. Line drawings show how they serve as basic equipment for every major field of power. Also available is a four-pager, MS-1328, which the company's Construction Machinery Division has prepared to tell about the operating and mechanical advantages of the 21000 engine as the power plant for its HD-21 turbocharged diesel crawler tractor. Illustrations include a cutaway of the "heart of a new engine combustion system." Specifications of the 225 net hp engine are included.

ITS NEW

#### Bulletin Describes JLO Engines

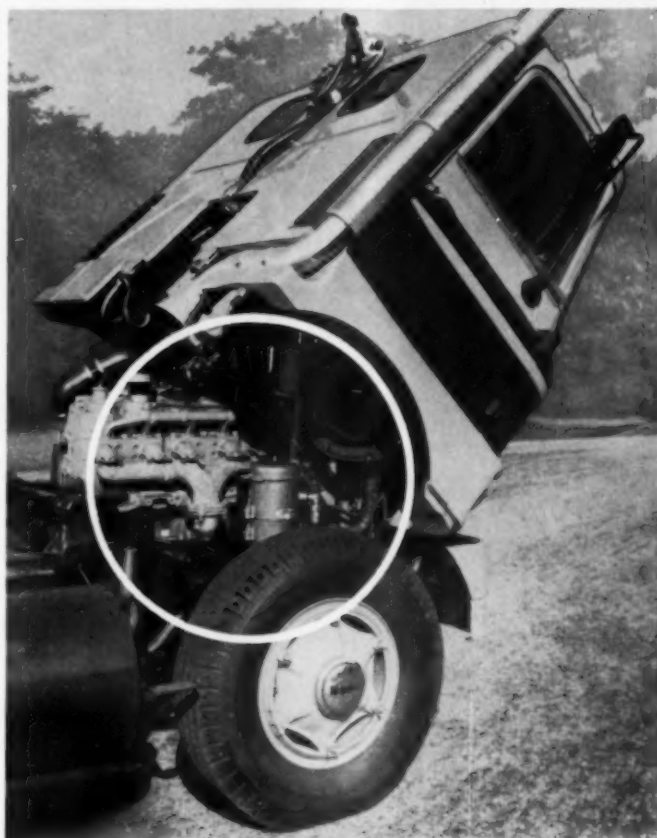
A four-page bulletin describing its new line of Jlo lightweight, two-cycle air-cooled diesel engines have been issued by Hercules Motors Corp. The bulletin provides a detailed description of the 7 hp Jlo-325 and 12 hp Jlo-660 along with dimensional drawings, performance curve charts, sketches of typical uses and

a list of more than 70 suggested applications. The German-built engines, to which Hercules has exclusive distribution rights within the Continental limits of the U.S., are described as particularly useful in such equipment as auxiliary generators, agricultural implements requiring 12 hp, contractors' pumps and construction equipment (such as asphalt batchers, spreaders, concrete saws and

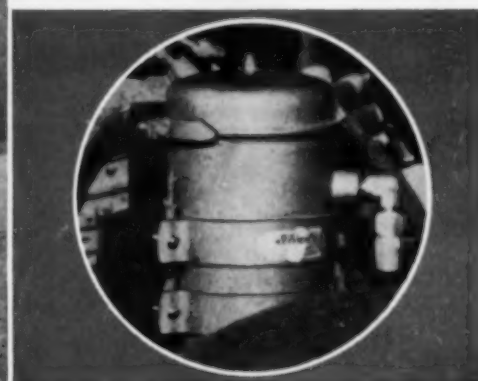
jointers, and pavers). Owing to the simplicity of construction, extensive use of aluminum in the engine, and reduced flywheel weight made possible by two-cycle design, the bulletin points out, the Jlo engines weigh less than 15 lbs./bhp with low BMEP. Copies of the bulletin may be obtained by writing Hercules Motors Corp., Canton, Ohio.

ITS NEW

## Now **WHITE** Diesels are standard ...with **WINSLOW**



**CP\***  
full-flow  
oil filters!



**TWO filters  
in ONE!**

New CUMMINS Diesel-powered WHITE 5000 with Winslow CP\* Filter—PROOF again that leading truck manufacturers give you THE BEST in filters!

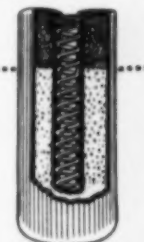
There's a Winslow CP\* element to fit your filter—any standard type, gasoline or diesel, fuel or lube oil. Switch to Winslow for long engine life!

Write for name of Distributor in your area

Let WINSLOW help you Capture  
Big Drip and Little Drip!



TWO materials—Fine and Superfine—in each Winslow CP\* element continuously self-adjust pressure, give TRUE full-flow of filtered oil—without incurring excessive back pressures.



\*Controlled Pressure.  
Patented, U. S. and foreign patents.

# WINSLOW

ENGINEERING & MANUFACTURING COMPANY  
4069 Hollis Street, Oakland, California, OLympic 2-0280





Smith's Transfer operates 175 Mack EMD 573 diesels between Staunton, Va. and Charleston, W. Va. The mountainous territory is tough on trucks—yet, regardless of road or weather conditions, there has never been a power loss caused by dirt entering the engine. Smith's Transfer specified Purolator dry-type air filters for its trucks; still uses Purolator exclusively. SO...

*When your customers specify Purolator Air Filters there's good reason for it:*

**"The engines on our Mack diesels show no measurable wear on rings, walls or valves... even after 250,000 miles"**

*Merle W. Bogan, Service Manager, Smith's Transfer*

Mr. Bogan always specifies Purolator because he realizes the importance of effective air filtration. He knows Purolator air filters prolong engine life, cut maintenance costs and reduce downtime to a minimum.

This is why you can be confident that any customer's specification is justified when, like Mr. Bogan, he insists on Purolator filters. What's more, you can confidently

recommend Purolator dry-type air filters as original equipment in your own standard line of diesels.

A Purolator engineer will be glad to present further details about the advantages and economies of Purolator filtration in the diesels you make. There's a Purolator filter designed to meet your requirements. Write or phone for full information — right now.

*Filtration For Every Known Fluid*

**PUROLATOR**  
PRODUCTS, INC.

RAHWAY, NEW JERSEY AND TORONTO, ONTARIO, CANADA



# DIESELS FOR HIGHWAY REEFER UNITS

By JAMES JOSEPH

**A**BANTAM weight diesel husky—F. Perkins Ltd's spanking new Four-99 high speed engine—may, say enthusiastic refrigerated van operators, be a big factor in dieselizing frozen food haulage along U. S. highways. Transicold Corp., a leader in transport refrigeration, is trial-testing the first of its Perkins-powered refrigeration units—and with some notable results. Dallas' big Frozen Food Express reports that Transicold's 7½-ton Perkins-powered reefer units (slung beneath refrigerated vans) need scarcely any maintenance, get hours more run time between overhauls and burn, on the average, but .4 gal. of diesel fuel/hr. By comparison, some of Frozen Food Express' smaller-tonnage, LPG-fueled reefer units average upwards of 1 gal./hr. And gasoline-engined units (which, like the Perkins, drive 7½ ton compressors) burn as much as 1.5 gal./hr.

Another big reefer fleet currently testing Transicold's dieselized system is Carolina Freight Carriers, Inc., homebased in Charlotte. From fleet headquarters, maintenance super Tom Harmon reports, "we're burning but ¾th gal./hr. in our Perkins unit . . . and we've had no maintenance at all . . . and this, tho one Perkins unit has run more than 800 hrs. to date."

Other truck-refrigeration system makers—notably Thermo King and McGraw-Edison (which makes the Tropic-Aire)—have also leaped on the diesel bandwagon. Thermo King, powering its UWD-30 compressor with a Mercedes-Benz 4-cylinder OM-

636 diesel, has been trial-running the combine for the past several months. Reports one Thermo King engineer, "Things look real good." McGraw-Edison, which for a couple years now has offered its Tropic-Aire unit diesel driven (by a 34 hp Continental ZD-129 engine) reports a significant swing to dieselization among fleet operators. Currently, the diesel-run units represent fully 15-20 per cent of Tropic-Aire sales.

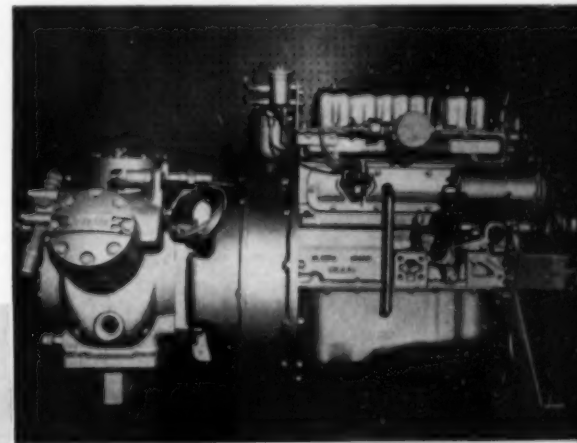
Transicold, which until 1958 designed all of its van cooling units around gasoline or LPG engines, believes that small, lightweight and economic diesels may all but push the gasoline engine from this, a major transport-engine field. Says Transicold's President, M. W. Brainard, "we've got about 300 Perkins Four-99's on order, a hundred of them en route right now . . . and we consider this only the beginning." Weight and size were the big factors which blocked Transicold's move toward dieselization until last year. "Weight", explains Brainard, "is life or death—

economically—for truckers. Every pound carried by a rig that isn't payload is lost load—and lost revenue. Until now, diesel engines were simply too heavy for our reefer customers to consider."

Since January, Transicold has been able to offer truckers a Perkins-powered reefer package which weighs, overall, scarcely more than Transicold's gasoline and LPG-powered refrigeration systems. For example, a gas-engined Transicold unit driving a 7½-ton compressor and fueled by LPG, weighs 1600 lbs; including a heavyweight 50 gal. butane tank. The same unit burning gasoline—and requiring only a 30 gal. fuel tank weighs about 1465 lbs. The identical unit, installed with a Perkins diesel engine and carrying a 30 gal. tank, weighs 1625 lbs. "Between all three units, there's but 200 lbs. difference, at most," points out Brainard. "Operational economies more than make up this relatively small weight differential."

21

Dieselized Transicold reefer unit—  
showing Perkins Four-99 engine driv-  
ing 3-cylinder Carrier 5F30 compres-  
sor.



Transicold diesel-driven unit installed  
on typical highway van.



Fuel-costs and high maintenance have been twin bugaboos plaguing gasoline-powered refrigeration units which began hitting U. S. highways in sizable numbers with the advent of frozen foods. A long haul trucker, for example, must hold frozen cargoes at zero and often, below. During a cross-country run, the reefer unit's engine operates almost continuously. Most fleets rate "good" any gasoline or LPG engine which goes 1000 hrs. between overhaul. Some get as few as 500 hrs. A few manage upwards of 4000 hrs. Cleaner burning LPG engines do better: some run 5000-6000 hours between majors. Transcold, however, expects its new Four-99s to double, and perhaps quadruple, run time between overhauls.

Linked to high maintenance costs is fuel consumption, a significant item when an engine operates continuously. A Transcold distributor in Texas compiled maintenance records on five fleets operating not only Transcold's LPG and gasoline fueled units, but also the new Perkins. One unit was selected at random from each of the five. Reported the distributor: (1) A gasoline engine driving a 5 ton compressor averaged .8 gal. of fuel hourly. (2) An LPG engine driving an identical 5 ton compressor hourly used 1.03 gal., on the average. (3) A larger LPG engine, driving a 7½ ton compressor, burnt an average 1.5 gal./hr. (4) The Perkins diesel engine, driving a 7½ ton compressor, averaged less than .5 gal./hr. Says Transcold's ass't sales manager and liaison engineer, John H. Grim, "We expect our Four-99 Perkins to run 8000-9000 hrs. between major overhauls . . . and to cut operating and maintenance costs in half."

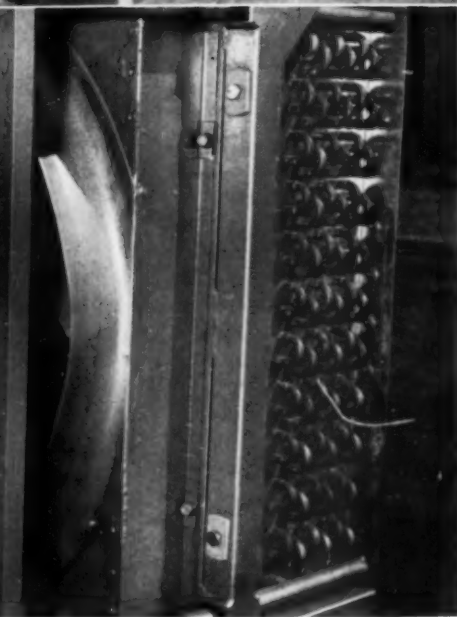
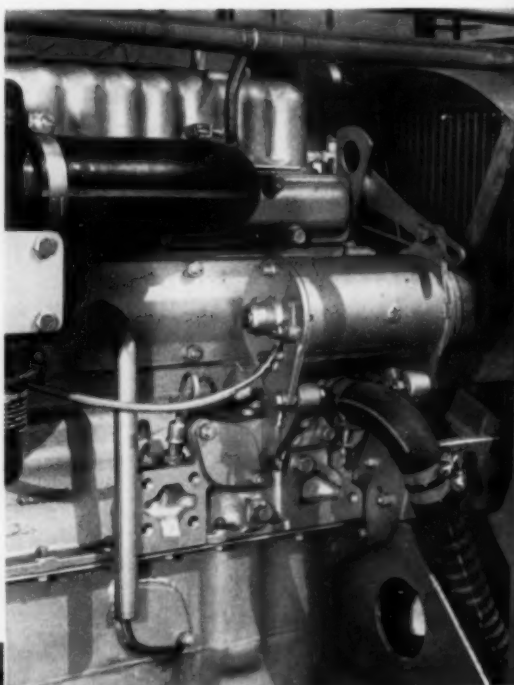
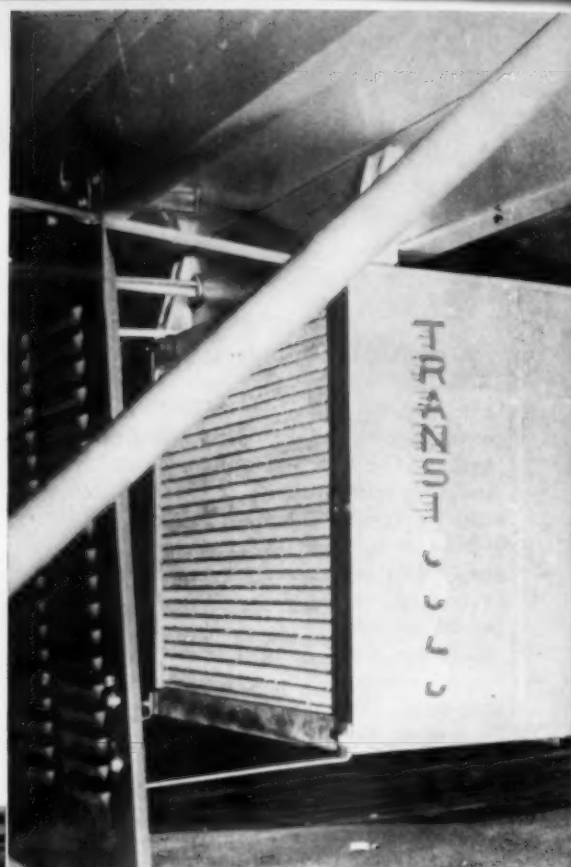
The unit which is fomenting the big switch to diesel engines for van refrigeration is Transcold's model 230. Core of the unit is a Perkins Four-99, four cylinder, four cycle water-cooled engine (see DIESEL PROGRESS July 1958), with a 3 in. bore, a stroke of 3½ in., a 99 cu. in. displacement and rated 22 hp at 1800 rpm. (Used in an ordinary

automobile, as during recent tests supervised by England's Royal Automobile Club, the engine developed 43 bhp at 4000 rpm. In the Transcold design, it is governed down to a "high speed" of 1900 rpm). Shock-mounted and hung from adjustable brackets beneath a reefer van, the engine drives a compressor, battery charging generator, fan (which cools both engine and condenser) and a Transcold designed model IR generator (which powers, among other equipment, two ¼ hp fans in the system's van-installed evaporator unit).

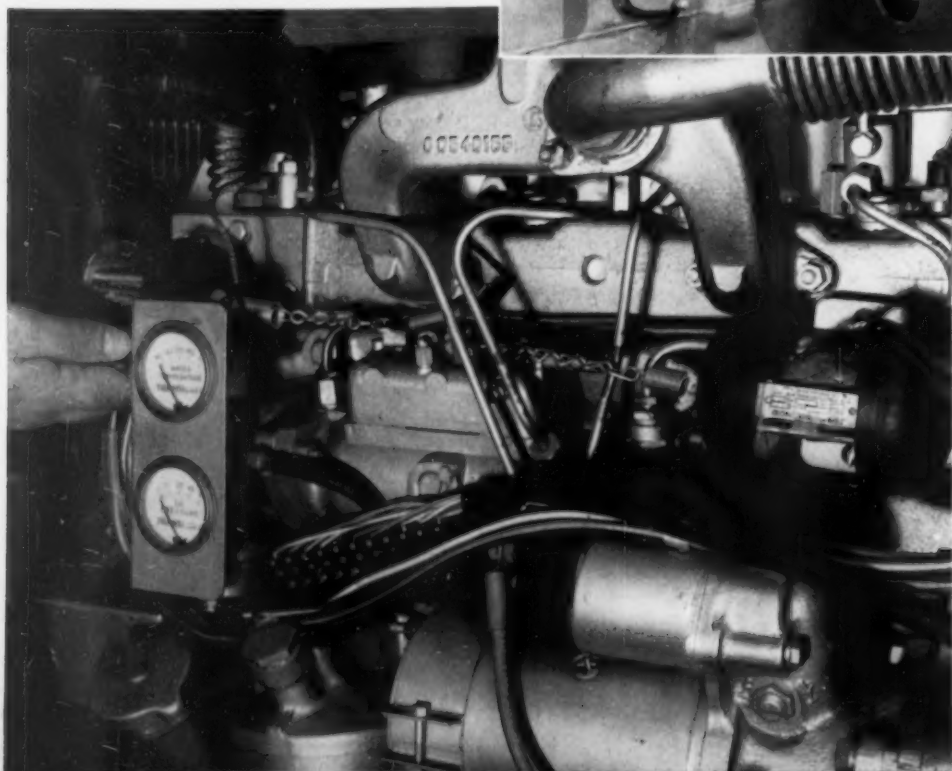
Transcold's model 230 Perkins-powered reefer unit is typically straight-line: condenser coils and radiator are set ahead of the engine's 6-bladed Schwitzer fan (which pulls 5000-6000 cfm). Next

Typical dieselized Transcold refrigeration unit is bracket-mounted beneath reefer van.

The standard Perkins fan was replaced in Transcold design with a Schwitzer fan which pulls five times more air thru condenser and radiator. Note how "package" is mounted in steel frame.



Mounted on engine is water temperature and oil pressure gauges. Chain driven C.A.V. governor is actuated by two solenoids.



in line is the engine, then Transcold's permanent magnet generator and last, the compressor. The Perkins directly drives (1) a 3-cylinder Carrier 5F30 compressor, its displacement 29.6 cu. in. and (2) Transcold's patented permanent magnet, brushless generator which delivers 120-volt, 3-phase, 60-cycle power at 1200 rpm. Belt-driven is an engine-mounted CAV 12-volt dc generator for charging the unit's two 6-volt starting batteries. Belt-driven, too, is the large engine-and-condenser cooling fan which has been substituted for the smaller engine-cooling fan standard to the Perkins. For example, Perkins' standard fan delivered only about 1000 cfm, since in most applications it merely cools the diesel's radiator. In Transcold's installation, of course, it does double duty—cooling the condenser coils as well. So Transcold switched to a 24 in. fan . . . for five-times greater air volume. In the process, the larger fan (dia.: 24 in.) was relocated ahead of the engine and con-



verted to belt-drive. Reason: to hold package height to 26 in. for the necessary road clearance.

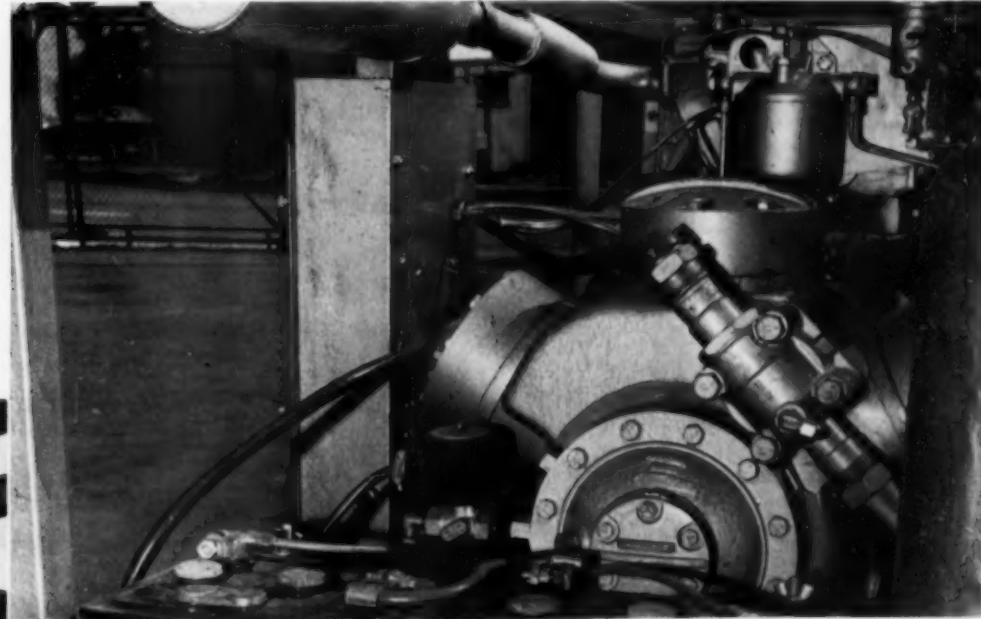
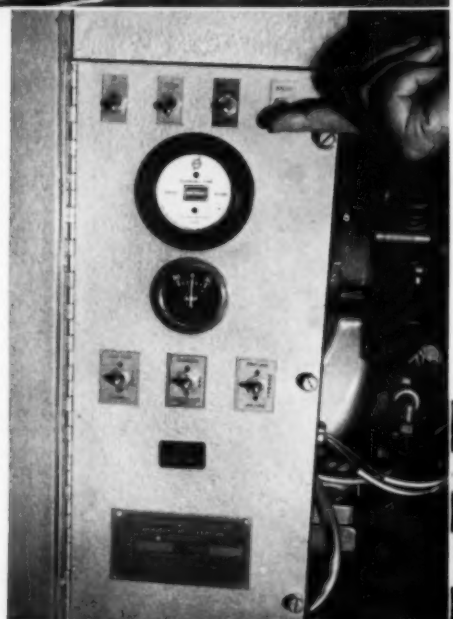
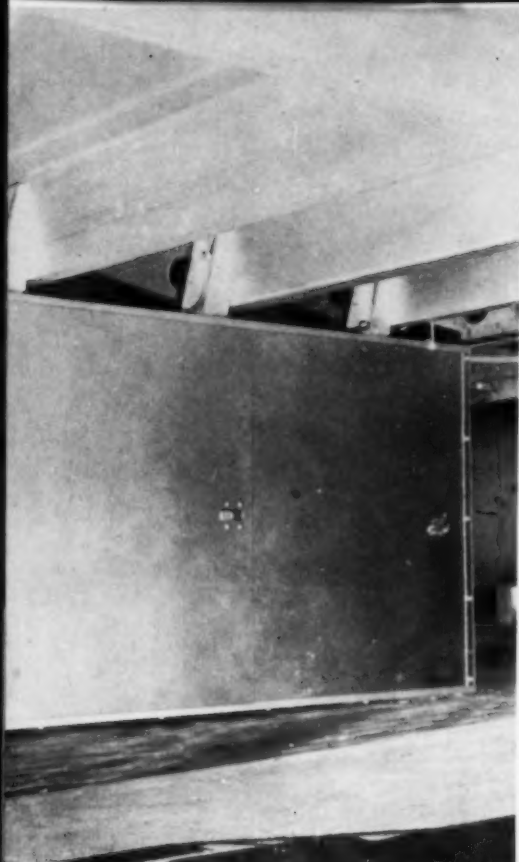
The Perkins unit also hews to Transicold's never-shutdown-engine thesis: Transicold units are governed to idle when a preselected load temperature is reached, but never to shutdown completely. Explains liaison engineer Grim, "frequent shutdowns and startups merely increase engine wear." Thus, one of two speed control solenoids, chain-connected to the engine's CAV governor, idles the engine to 1100 rpm when cargo temperatures reach preselected limits. When additional refrigeration (or heat) is required, the engine is governed to "high speed"—about 1900 rpm's. So critical is the governing that cargo temperatures are held within  $\pm 1/2$ -degree. To stop, the engine's fuel is shutdown by solenoid action. The unit is initially started-stopped from a self-contained control panel. Temperature control is pre-set by cargo handlers or drivers from a selector switch installed on the outside front of the van. An unloader on the compressor assures that at start-up, only one of the three cylinders is loaded . . . this, to reduce starting torque. When compressor oil pressure rises sufficiently, the remaining cylinders take up the load. In most of

the Perkins installations now being cargo-tested, the diesel's 30 gal. fuel tank is mounted beneath the van, alongside the condenser section of the refrigeration unit.

Transicold calls its dieselized reefer unit "a new page in transport refrigeration history". And well it might be. For what frozen cargo handlers get is a heavy duty industrial engine—with all the economy and performance of dieselization, yet an engine scarcely heavier than its less rugged gasoline competitors. Transicold's big switch? It's likely to dieselize frozen food haulage along U.S. highways.

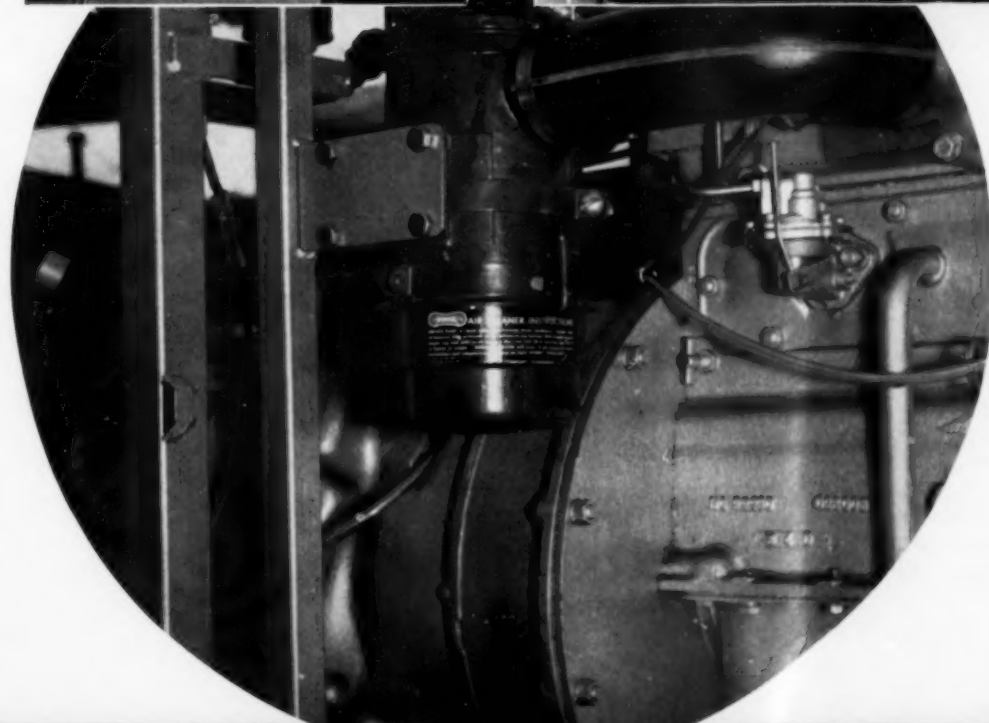
### Principal Equipment

Engine .....	F. Perkins Ltd.
Compressor .....	Carrier
Generators .....	Transicold and C.A.V.
Governors .....	C.A.V.
Fan .....	Schwitzer
Speed Solenoid .....	West Coast Solenoid Corp.
Air Filter .....	Vortex
Oil Filter .....	Perkins
Exhaust muffler .....	Kittell
Cold weather starting .....	Perkins



Left center—Exterior control panel, on Transicold's dieselized reefer unit, converts operation to pushbutton control.

Above—Rear view of compact Transicold dieselized unit. Note the two batteries, the Kittell muffler and diesel-driven compressor.



◀ Vortex air filter serves Perkins Four-99 engine in Transicold design.



# ZEELAND CUTS COSTS

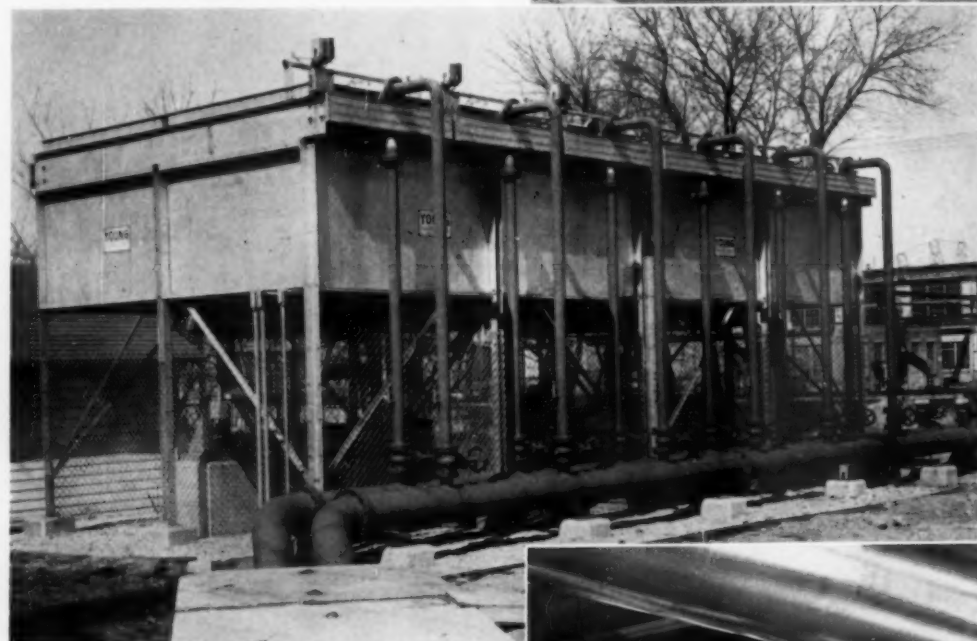
## 2800 hp Fairbanks-Morse Dual Fuel Engine Is Largest in the Michigan Municipal Plant, Takes Over Lion's Share of Generation

By DWIGHT P. ROBISON

A new 2800 hp Fairbanks-Morse dual fuel diesel is meeting the increasing demands on the Zeeland, Mich. municipal generating station and at the same time is cutting production expenses. In the first four months of the current fiscal year, the new engine produced 71 per cent of total plant output at a fuel cost 21 per cent below the previous plant average. Zeeland is a solid, thrifty community, a piece of the Netherlands transplanted in west central Michigan. It has many sources of prosperity—the nearby resort areas, the rich agricultural lands with crops of celery, onions and blueberries, a multitude of chicken hatcheries, several furniture factories, a lumber mill, a chemical plant, and a number of varied light manufacturing plants. For more than 20 years, electricity for the homes, stores and industries of the city have been provided by diesels in the municipal power plant. First engines to go into service were two 375 hp Fairbanks-Morse diesels in 1937. In 1939, a 695 hp F-M engine was added and two years later a second identical unit was put on the line. These prime movers carried the city through the war years, but in 1947 peak load topped firm capacity and Zeeland installed a 1400 hp Fairbanks-Morse diesel. The sharp post-war climb in demand led to the addition in 1949 of a 1600 hp F-M opposed-piston diesel. This compact unit replaced one of the original 375 hp engines and rests on the same foundation. In 1952 the city decided to try a radial engine and installed a Nordberg diesel rated at 1800 hp. The successive expansions kept plant capacity ahead of peak demand, but not far ahead. At the time of each installation, firm capacity was below peak load, necessitating operation of the largest engine. With population rising and residential consumption growing steadily, Zeeland put into service in October 1957 the seventh and by far the largest Fairbanks-Morse diesel to serve the city. This unit is a model 31AD18 dual fuel diesel with 8 cylinders, 18 in. bore and 27 in. stroke, rated 2800 hp at 277 rpm. The big engine drives a 2,000 kw F-M alternator.

The new engine was intended for base load service, but the unit's efficiency and fuel economy led to even greater use than had been anticipated. Though it operated less than nine months in the fiscal year ended June 30, 1958, it produced 5,305,000 kw-hrs, more than 40 percent of the plant total of 12,944,100 kw-hrs. The engine hit a peak in May, running 657.9 hrs. and producing 895,000 kw-hrs of the plant's 1,104,590 total. From July through October 1958, the big unit generated 3,217,000 kw-hrs, 71 per cent of the plant's 4,502,500 kw-h production. Actually, this heavy work schedule has meant that the new engine cannot realize its full efficiency potential for it is called on to

operate at poor load factors, often well below 50 per cent. Economically, this policy has been sound and has meant money in the bank for Zeeland. Operating on straight diesel fuel, the new engine is the most efficient in the plant. In addition, the engine can operate on natural gas with a small quantity of pilot oil. This combination of factors has made it profitable to run the big unit at poor load factors even though gas costs 45 cents/mcf and pilot oil 12.5 cents compared with diesel fuel at 10 cents a gal. The figures tell the story. In the fiscal year ended June 30, 1957, average fuel cost for the plant was 8.24 mills per kw-h. In the following year, with the new engine operating less than nine months and part of that time on straight

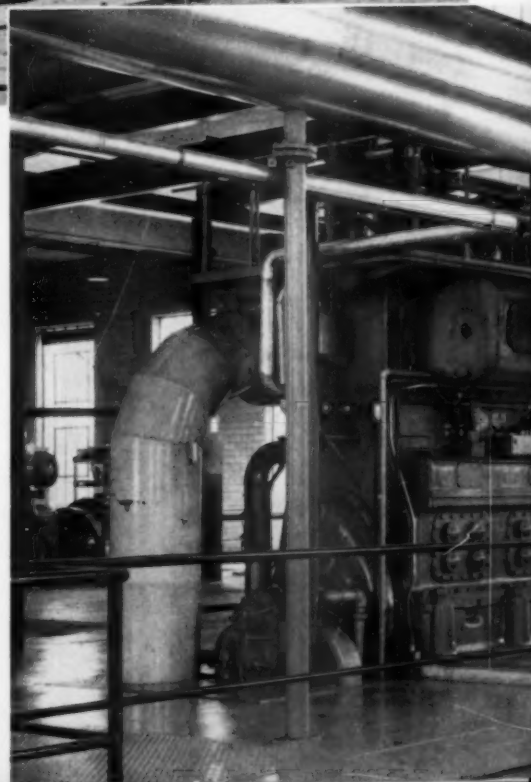
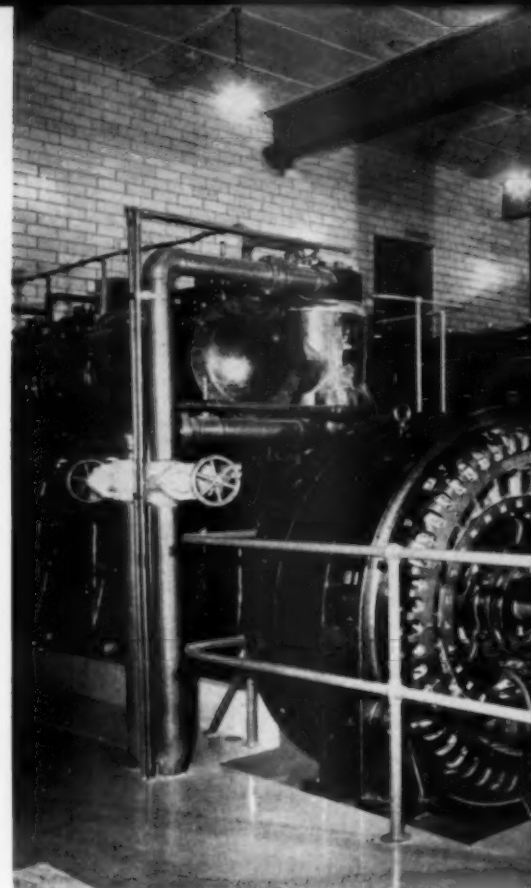


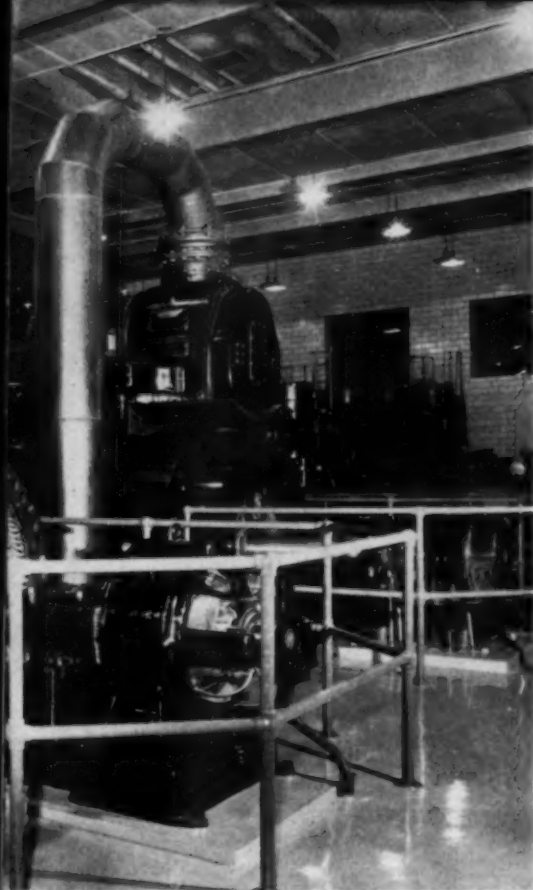
Engine jacket water is cooled in this Young radiator. An additional unit is out of sight to the right.

Newest and largest engine in the plant is this Model 31AD18 Fairbanks-Morse dual-fuel diesel rated at 2800 horsepower at 277 rpm. Installed in October 1957, this unit has taken over the lion's share of the load.

oil, the plant average was down to 7.27 mills. For the first four months of the current fiscal year, average fuel cost was cut further to 6.52 mills. The big engine itself averaged 5.74 mills per kw-h for this period. In September, its peak production month, the engine turned out 899,000 kw-h at an average fuel cost of 5.30 mills per kw-h.

Trend in power sales is favorable to efficient plant operation. Some of the seasonal industrial load is being replaced by greater residential consumption.

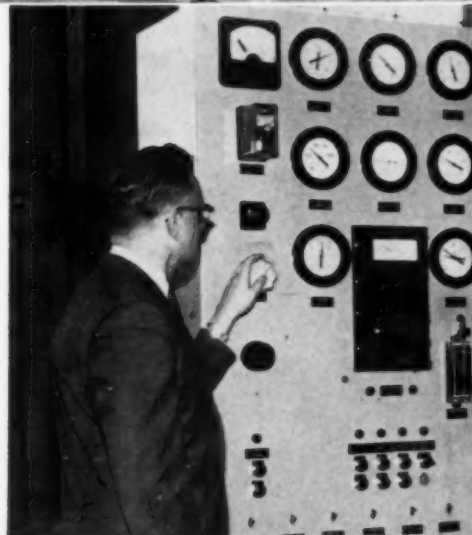




The prevalent gain in air conditioning has helped build the summer load so that summer peaks are not far below winter peaks. As the load grows, it will be possible to carry heavier average loads on the big engine with resultant gains in efficiency and economy. Zeeland has always translated diesel economy into low rates to consumers. Residential rates are among the lowest in the state, starting at 4.2 cents per kwh for the first 50, then dropping to 2.1 cents for the next 150 kwh and 1.6 cents for the balance. For controlled water heating, the consumer is allowed 340 kwh at 1.07 cents. In the last fiscal year, average price paid for all the electricity sold was just 2.3 cents a kwh.

◀ Fairbanks-Morse diesels have provided power for Zeeland for 21 years. Here are four of the six F-M units in the plant. From left to right are: one of the original 375 hp diesels, the 1600 hp opposed-piston engine, a 690 hp model 33D14 engine, and a 1400 hp Model 33F16.

At the engine gauge and alarm panel for the new Fairbanks-Morse engine are (l. to r.) Board of Public Works President Elmer Hartgerink, Hugh De Pree, Peter Brill and Mayor D. C. Bloemendaal. The F-M panel holds an Alnor exhaust pyrometer, Marshalltown gauges, and complete pressure and temperature alarms.



The new engine was provided with a full complement of accessory equipment, some of it designed to improve operations for the entire plant. Thus, the radiators that cool jacket water for the new engine have sufficient capacity to serve the full plant. At present only the new No. 7 and the No. 5 engines are hooked into this system but it is planned to add the rest of the units to the common header. Jacket water for No. 7 is circulated by a motor-driven centrifugal pump and temperature is controlled by a thermostatic proportioning valve. Wells provide cooling water make-up. Radiator-cooled water also is circulated through a shell-and-tube oil cooler to cool the lube and again temperature is controlled by a proportioning valve. The main engine-driven lube pump

circulates the oil through the engine, the cooler and a full-flow filter. Part of the lube is bypassed through a cartridge-type filter. A motor-driven auxiliary lube pump performs before-and-after service and is big enough to serve as a standby for the main pump. Since a different fuel oil is used for pilot oil on the new engine, a 10,000-gal. tank was allocated to this service. The fuel is transferred automatically to a 600 gal. day tank in the plant basement. The No. 4 fuel oil used for straight operation is unloaded into a 20,000 gal. tank heated by hot jacket water from the plant. The oil is put through a purifier into a 10,000 gal. tank from which the individual engine day tanks are supplied. Scavenging air for the two-cycle dual-fuel diesel is drawn from roof level through a pipe to a concrete chamber in the basement where it is passed through a self-cleaning filter. The air then goes to a 13,650 cfm blower driven at 3550 rpm by a 250 hp motor, then through an intercooler to the engine's intake header. Volume of air is regulated to achieve maximum combustion efficiency. The dual-fuel engine normally operates on natural gas fuel with a small quantity of pilot oil but can switch instantly to full oil operation if gas supply should fail. Naturally, it is economical to keep pilot fuel to a minimum and this has been accomplished. For example, in the peak production month, 899,000 kwh were produced with a consumption of 9,472.5 mcf of gas and 4,086 gal. of pilot oil, an average of 10.53 cu. ft. of gas and just 0.00454 gal. of oil/kwh.

Zeeland's successful electric utility is operated under the direction of Utilities Manager Kenneth R. Engstrom with Ross Vander Wall as Plant Manager. Policy supervision is exercised by Mayor D. C. Bloemendaal and the Board of Public Works under President Elmer Hartgerink, with John Holleman as Acting City Manager. Consulting engineer for the plant expansion was J. B. Sims of Grand Haven, Mich. In expanding the building, the city left room for still another engine. This clearly is an expanding community and the plant now serves a city population of 5,000 and another 1,500 outside city limits. The Zeeland generating station is 21 years old and, with the big new F-M engine bringing new performance records, the plant has really come of age.

**Table I**  
**Zeeland, Michigan**

	1938	1948	1958
Kwh Generated	1,125,000	5,750,000	12,944,000
Peak Load (Kw)	400	1,550	3,520
Plant Capacity (Kw)	500	2,430	6,566
Firm Capacity (Kw)	250	1,450	4,566

**List of Principal Equipment  
Serving New Engine**

Engine	Fairbanks-Morse
Alternator	Fairbanks-Morse
Governor	Woodward
Blower	Roots-Connersville
Oil Cooler	Young
Radiator	Young
Air compressor	Quincy
Pyrometer	Alnor
Lube oil pump	Roper
Lube oil filter	Commercial



# INTEREST GROWS IN BOW STEERING

By DOUGLAS SHEARING

**T**RANSPORTATION of freight on the Mississippi Valley waterways now tops 200 million tons of cargo per year. To handle this enormous amount of shipping there has been a steady increase in the size and speed of individual tows. More powerful and efficient towboats, with every modern device for safe navigation in any weather, together with improved methods of handling barge fleets at terminal points, keep this huge volume of cargo moving at high speed. No other branch of freight handling has shown so much improvement as has taken place on our inland waterways.

As tows have increased in size and speed the need for better control of these tows has become more apparent. While powerful towboats with triple or quadruple propellers handle the big fleets of barges adequately under normal conditions, there are times when additional control becomes most needful, even indispensable. This need has focused more and more attention upon bow steering. The advantage of bow control when entering or leaving locks, or in numerous places in our inland waterways, especially under adverse weather or current conditions, has long been recognized. Practicable bow steering, perhaps because of the problems involved, is a comparatively recent development. Increasing interest now indicates that it is destined to become more and more important, not only on our inland waterways but also for some types of ocean-going ships.

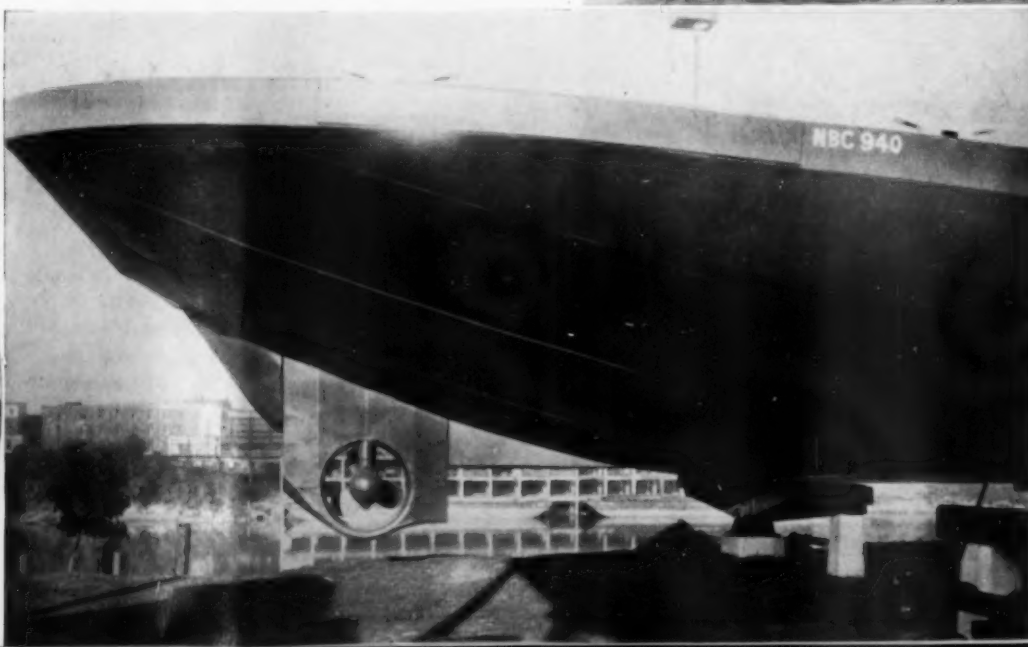
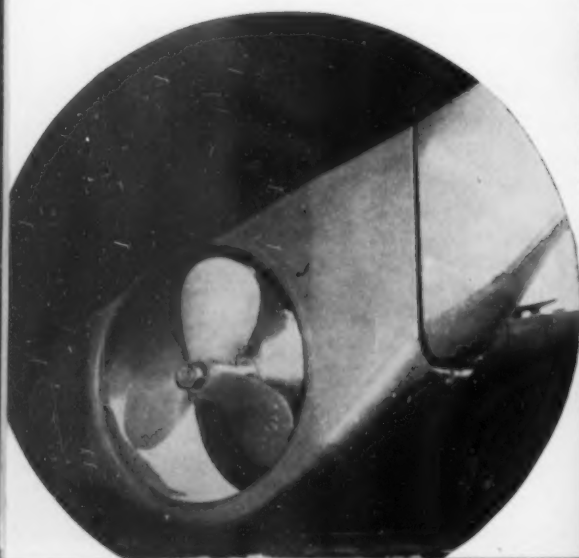
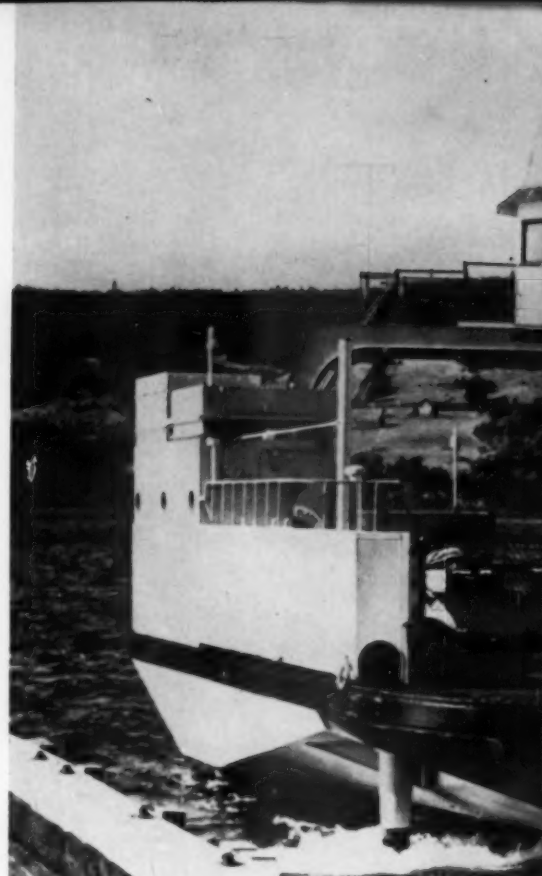
There are two main types of bow steering in use today. One consists of a propeller whose shaft is fixed in an athwartship position, being driven through gears by a vertical shaft extending up into

the hull or to the deck, where it is connected to the prime mover. The thrust of this propeller is directed athwartships, tending to push the bow of the barge in the opposite direction. For thrust in the other direction the drive must be reversed. Since a conventional propeller is designed mainly to push in one direction and is very inefficient in the reverse direction, it will be seen that a bow steerer of this type leaves much to be desired. Even should a special propeller be used which is a compromise between conventional ahead and astern design, there seems little chance for improved performance and it still requires continual changes in the direction of rotation for thrust in either direction.

The second type of bow steerer consists of a Harbormaster drive and propeller which can be rotated 360 degrees. Principal advantage of this steerer is that the propeller is constantly driven in one direction and always pushes in the manner for which it was designed. Other advantages are that the direction of thrust can be changed at will throughout the 360 degrees. In some installations this can result in an assist to the main propulsion as well as excellent bow control. This type of bow steerer is more effective than a fixed position type that a smaller unit may be used for equal results.

Both the Harbormaster and the fixed position type may be installed in various ways. For the utmost thrust the propeller should be well submerged and clear of the hull or appendages. However, since it is installed at the bow and subject to damage by collision with any object, floating or otherwise, it is customary to provide some form of protection. In general, the more protection that is built around it the less efficient it becomes. So most installations end up in some compromise. Another factor that must be given consideration is the variation between light and loaded drafts in waters of limited depth. When fully loaded the bot-

Lead barge of Winchester tow, right, showing bow steerer in lowered position for light draft condition and below, raised for loaded draft.







◀ **Nova Scotia Highway Dept. vehicle ferry, Percy C. Black.**

tom of the modern barge is close to the draft limit on many waterways. In this condition any bow mechanism must have clearance above the base line. However, with the barge in light condition the propeller may well be two-thirds out of water and practically useless. In such cases a means to raise and lower the propeller vertically is employed. This is illustrated by the photograph of the *Winchester* bow barge which has a retractable fixed position propeller with reversible drive. Ashland Oil Company's towboat *Winchester* pushes four jumbo oil barges carrying 10,000 tons of oil. This tow, over 1200 ft. long, has been operating over eight years with the assistance of a retractable, fixed position bow steering drive furnished by Murray & Tregurtha, Inc.

An example of the Harbormaster drive is shown by the photographs of the Western Pacific Railroad car ferry *Las Plumas*. This vessel, designed by L. C. Norgaard and Associates of San Francisco and built by Albina Engine and Machine Works, of Portland, Ore., is 375 ft. long overall, with a beam of 59 ft. and a depth of 16 ft. There is ample draft for this bow steerer to operate in either light or loaded conditions. This Harbormaster has a General Motors 6-110 diesel engine of 220 hp which drives a 60 in. dia. propeller a maximum of 308 rpm. On the trial trip of the *Las Plumas* on the Columbia River below Portland this bow steerer demonstrated its ability to quickly turn the vessel within its own length and also to propel it against the river current without assistance from the main engines.

Another example of bow steering is the installation on the vehicle ferry *Percy C. Black*, owned and operated by the Nova Scotia Highway Department at Ross Ferry. This vessel, designed by Milne, Gilmore and German of Montreal and built by Ferguson Industries Ltd. at Pictou, Nova Scotia is 151 ft. long with a beam at deck of 40 ft. and a depth of 11 ft. It has a capacity of 20 automobiles. The *Percy C. Black* is powered with two model 06-2C Harbormasters driven by Caterpillar model D-337F Diesel engines, each rated 182 hp. These units are installed one at each end of the

hull but on opposite sides. This ferry is never turned around, but takes cars on at one end and discharges them at the other end. So regardless of which way the ferry is going, one of the units is pushing at the after end and the other, pulling and steering at the forward end. The control console in the pilot house has two sets of controls for each unit, allowing the pilot to face forward regardless of the direction the ferry is traveling. |

What is thought to be the first bow steerer in use on our inland waterways was installed in 1946 on the *Cartasca* tow, owned by Cargo Carriers. This bow steerer is mounted in the bow rake of the lead barge, with the stem extending down through a well in the rake. A sheer pin allows the stem and propeller to swing back and up should the bow of the barge run aground. This bow steerer is driven by a General Motors diesel engine rated 150 hp. The main propulsion of the *Cartasca* consists of three Harbormasters driven by General Motors diesels, each unit rated at 330 hp. Based on their experience with the bow steerer on *Cartasca*, Cargo Carriers later installed Harbormaster bow steering units on their *Carpaul* and *Carpolis* tows. These units are installed on separate barges the size and shape of a conventional bow rake. This method allows the bow steering section to be placed at the front of any of their box barges, thus making it more useful.

There is a growing interest in bow steerers on other than inland waters. This device is, of course, ideally suited for use on railway car and vehicle ferries operating at our seaports. It is also being considered for use on ocean-going ships that now have to depend on tug service at some of their ports of call. Other types of vessels on which bow steering is a decided advantage are survey ships, self-propelled dredges and some classes of military vessels. All bow steering units mentioned here are controlled from the pilot house. Because the pilot has almost instant control of the course of his vessel or tow, where without a bow steerer it was sometimes impossible, a new factor of safety has been made available. This, plus the valuable time savings in locking, etc., gives assurance that we will see a great many more vessels equipped with bow steerers.



◀ **Harbormaster bow steerer powered by 330 hp diesel installed on lead barge of Carpolis tow.**

**Western Pacific Railway car ferry Las Plumas left and below, closeup of 220 hp Harbormaster bow steerer.**



# ENGINE WEAR TESTED WITH RADIOACTIVE LINER



Preparing to heat the liner in an oven.



Chilling the radioactive sleeve.



Shrinking the radioactive sleeve in the liner.

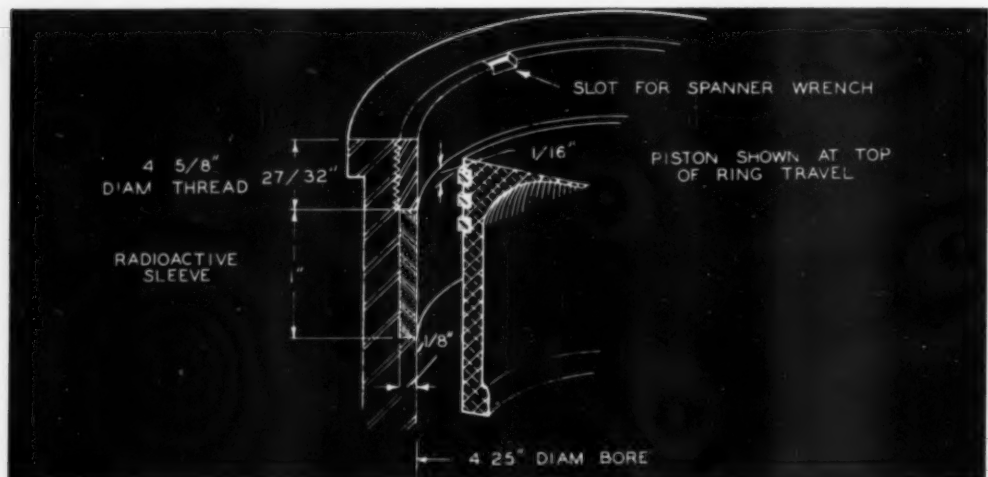
**I**N the past, most tracer wear data in laboratory engines have been obtained with radioactive piston rings. This is the simplest and cheapest method. The importance of liner wear, however, caused California Research Corp., a subsidiary of Standard Oil Co. of California, to equip their Richmond Laboratory  $4\frac{1}{4}$  in. bore diesel engine with a radioactive liner.

A short, sleeve-shaped piece was selected for the wear area because it could be located at the top of ring travel where most of the wear occurs. A full-length radioactive sleeve could not be used because of the radiation hazard its great size would create. A standard liner was machined to accept the sleeve as shown in the drawing. The wear sleeve and a threaded locking sleeve were machined from another liner. After being irradiated, the wear sleeve was shrunk in place in the liner. Special tools were used for the assembly of the three parts so that all work could be done at a

safe distance. The bore was then honed to remove any protruding edges at the two joints. The radioactive liner was installed in the engine in the normal manner using standard, cast iron piston rings. The various stages of assembly and installation of the radioactive sleeve are shown in the photographs.

Initial testing showed the installation to be completely satisfactory. Liner wear seemed to follow the same trends as piston ring wear although the whole level of wear rates was much lower, about one-sixth. Using the radioactive sleeve, California Research obtained, among others, the following results with distillate fuel:

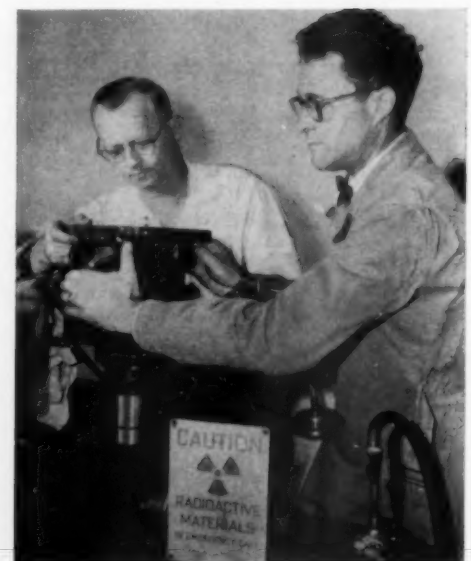
1. Liner wear increased rapidly with increasing load.
2. Below 150° F to 155° F jacket temperature the wear rates were very high.
3. Lubricating oil compounding reduced liner wear at least as effectively as ring wear.



Cross section of liner with radioactive sleeve.



Honing the liner in the cylinder block.



Installing the cylinder and liner assembly.



# MILL CREEK SEWAGE PLANT

**New Treatment Plant Costing \$25 Million With Rated Capacity Of 120 Million GPD Nears Completion in Cincinnati; Four Cooper-Bessemer Engines to Operate on Sewage Gas and Supply All Power Requirements for Modern Facility**

By ROBERT E. SCHULZ

**N**EW regulations on stream pollution, a growing population and thriving industry are the combination of elements that have brought to this progressive city on the Ohio River, one of the finest metropolitan sewage disposal programs in the nation. Current interest here in Cincinnati is focused on the Mill Creek Sewage Works, second of three new plants in the program, but by far the largest. Due for completion in early fall, the facility will cost \$25 million and have a capacity of 120 million gallons a day. The Little Miami Sewage Works, first of the program, is already in operation and has a capacity of 28 mgd. The final plant, tentatively called the Muddy Creek Works, is presently in the design stage and will have a capacity of 7.5 mgd.

Located near downtown Cincinnati, the Mill Creek plant will provide primary treatment for the sewage from the highly industrialized Mill Creek Valley drainage area which covers approximately 133 square miles. This plant, like the Little Miami and Muddy Creek Works, was designed by Havens and Emerson, Consulting Engineers in Cleveland and is under the capable direction of the city's Principal Engineer of Sewage Disposal, Arthur D. Caster. Totally integrated, the Mill Creek facility produces all of its own electrical energy for pumping, comminution, flocculation, digestion, etc. as well as for building lighting and power.

The power station, situated in the northeast corner of the plant, was completed in early fall of 1957, well ahead of most of the other buildings and system components. It is designed for high level operating efficiency through the use of sludge gas as principal fuel for the engine generating units and the recovery of waste engine heat for activating sludge in the 12 digesters. Principal prime movers are three Cooper-Bessemer type LS-8-GDT turbocharged dual-fuel engines with eight cylinders of 15½ in. bore and 22 in. stroke. Rated 1910 hp at 327 rpm, each drives a 1350 kw, 4160 volt, 3 phase, 60 cycle Ideal Electric generator. When the three units were being installed, a foundation was also completed for a fourth identical engine-generator set. This unit is now on order and will be installed soon.

The power plant, with its light brick exterior and tiled green interior, has a very striking appearance. The Cooper-Bessemer engines and their generators, as shown in the photographs, are spaciouly installed in the main bay with the electrical switchgear. A quarter deck to the rear accommodates the waste heat recovery silencers, jacket water piping and controls. In the far west corner is a Caterpillar D-318 diesel generator set rated 92 hp, 59 kw at 1800 rpm installed to supply emergency power for station compressors, water and oil pumps and station lighting. In the lower level of the power

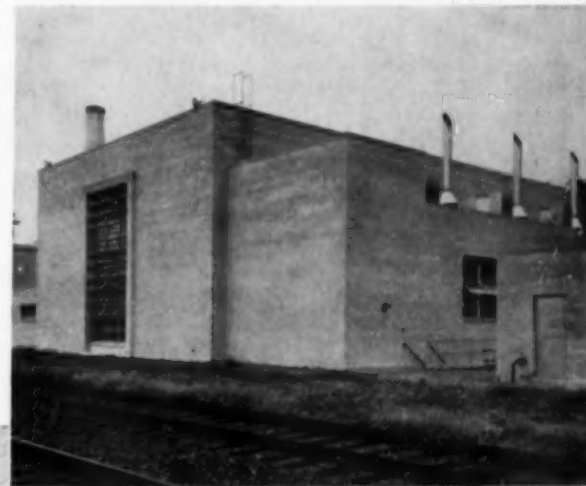
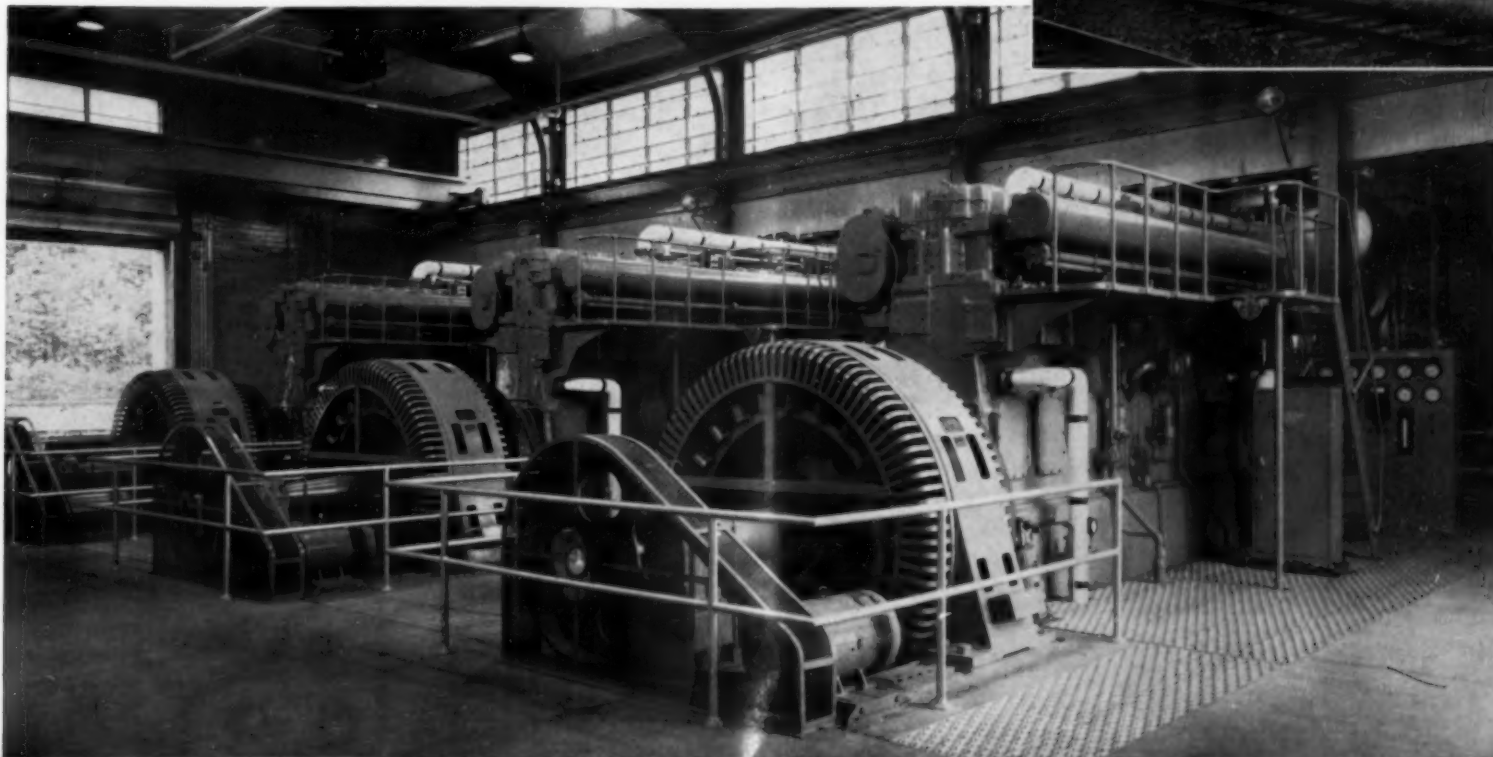
house is a service area plus the functionally arranged engine and plant auxiliary equipment.

Target date for full scale operation of the Mill Creek Works is set for September 1 of this year and until that time, the power plant is providing only that power required for light and power in the completed facilities. Planned operation calls for two of the four Cooper-Bessemer engines to be on the line on a continuous 24 hr., 7 day week basis once operation commences and a third unit added to this schedule as load increases. The diagram illustrated shows the electric generation and distribution system for Mill Creek.

The American intake air filters and Marley cooling towers on the deck of the power plant. Building at left houses fuel unloading and foamite controls.

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The three 1910 hp Cooper-Bessemer engines drive 1350 kw Ideal Electric generators at 327 rpm. Small panel adjacent to engine houses automatic-pneumatic controls. Board to rear has all operating gauges including Alnor pyrometer. Fourth unit will be installed at far left.





The four main generating units, each rated 1350 kw, feed into a 4160 volt main bus. Shown in each of these incoming circuits is a high voltage, power-circuit-braker, by which means any or all of the generating units may be connected or disconnected from the system. Leaving the main bus are five outgoing circuits which transmit 4160 volt current to the several substations of the project. These circuits also include power-circuit-brakers for flexible electrical switching. Each of the outgoing circuits terminates in a distribution substation or at a switching substation. In the distribution substations the voltage is decreased to 440 and further distributed through a multiplied number of low voltage circuits. Also shown in the diagram are six distribution substations with respective capacities of 1000 kva, 500 kva, 225 kva, 300 kva, 300 kva and 500 kva, plus the 4160 volt switching station. Power from this latter station serves the nine 4160 high voltage motors indicated in the diagram driving the 400 hp main pumping units.

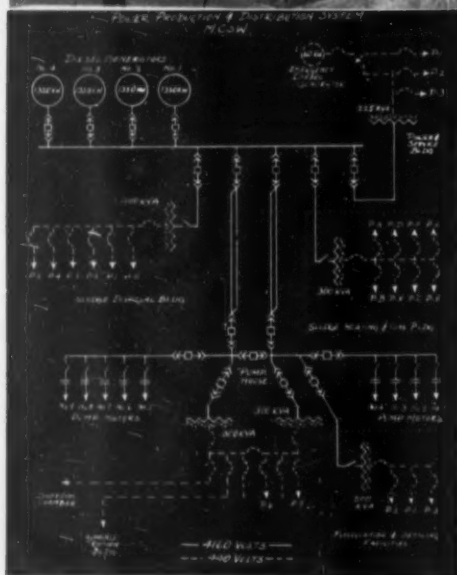
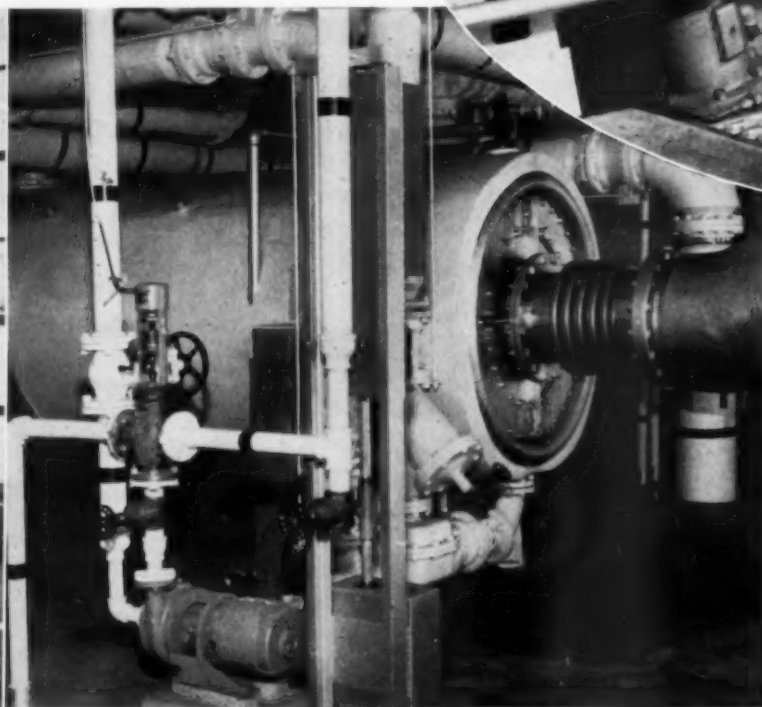
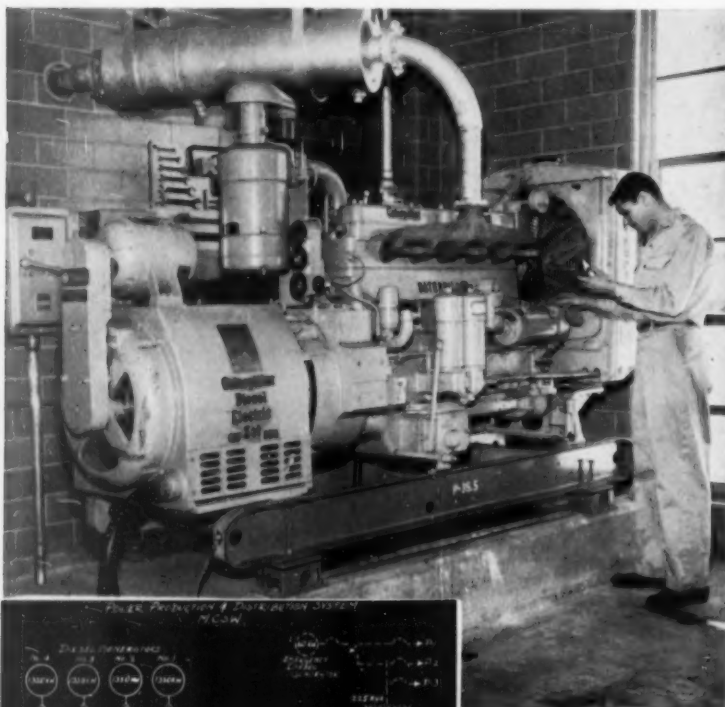
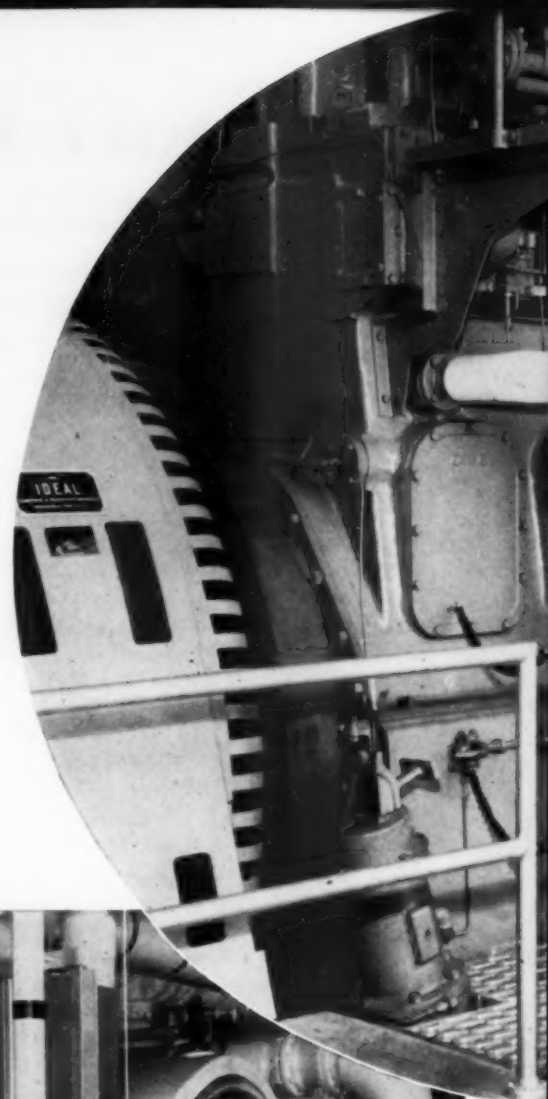
Since the Mill Creek Sewage Plant is not in operation, the Cooper-Bessemer engines are currently operating on a No. 2 fuel oil. Storage for the oil is provided by a 158,000 gal. capacity above ground tank equipped with a complete foamite

spray system and located north of the power house. Fuel is delivered by either truck or railway tank car with unloading stations for each having a 100 gal./min. capacity. The projected date of full scale operation indicates that the Cooper-Bessemer engines will be switched to dual fuel operation some months later. The sludge gas to be burned is formed in the 12 digesters and collected in domes of each. It has a 600 Btu low heat value and the density is approximately 0.865 referred to air.

Average analysis is as follows:

Methane .....	70%
Carbon Dioxide .....	28%
Hydrogen .....	0%
Nitrogen .....	1.9%
Hydrogen Sulphide .....	0.1%

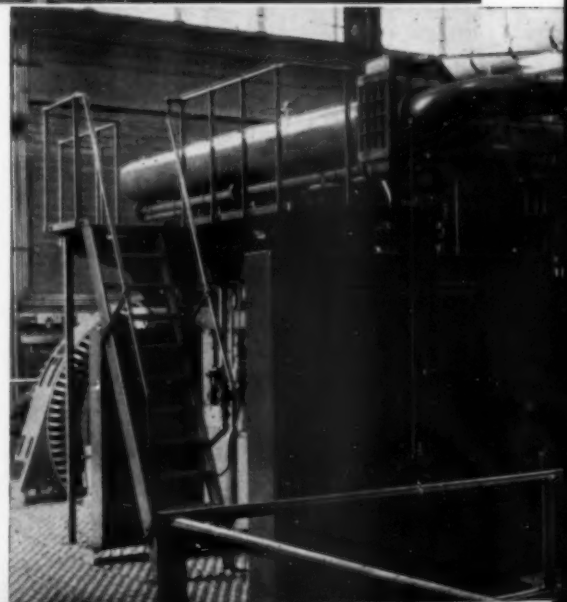
Gas from the digester domes flows to a receiver from which it is drawn and compressed to 29.9 psi gauge and stored in two 45 ft. dia. spheres, each of which has a capacity of 47,710 cu. ft. The sludge gas is then piped underground and connects with the main engine room header. It is then compressed, metered and delivered to surge tanks serving each engine. Based on extensive tests at Cooper-Bessemer's Grove City, Pa. plant, it is



▲ Caterpillar D318, 59 kw emergency diesel generator is served by Maxim silencer, Donaldson air cleaner, Leece Neville electrical equipment and Korfund vibration dampers.

Exhaust gases transfer heat to the jacket water in these Maxim heat recovery silencers. Amot thermostatic valve bypasses water to emergency cooler whenever temperature exceeds 165° F. Fulton-Sylphon control in foreground controls temperature of intercooler water.

End view of Cooper-Bessemer engine showing turbocharger, CFC Fulflo filters, Young intercooler and attached Viking lube oil pump.

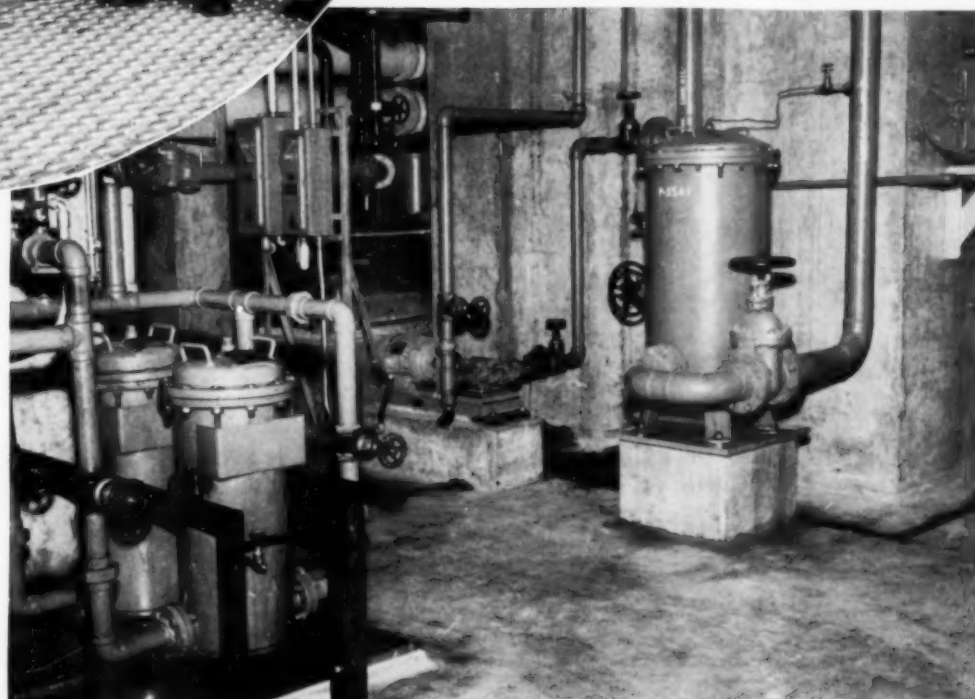




planned that the gas-fuel oil ratio will be about 93:7. Not only does Mill Creek produce the bulk of its own fuel, but it utilizes waste heat from engine operation to speed bacteria action in the sludge digesters and promote production of more gas. This, I think, is typical of the efficiency that has built this plant. In operation, engine exhaust gases, after passing through the turbocharger, flow directly through individual waste heat recovery silencers which are tied into a closed jacket water system. Jacket water is pumped through the shell of the silencers by four motor driven pumps, rated 750 gpm at 56 ft. head. It next passes through a heat exchanger, gives up 15-20 degrees of heat to the digester heating water system, and returns to the engine at approximately 165° F. In event of trouble in this system of heat transfer, there is a thermostatic valve which by-passes jacket water to an emergency cooling unit whenever engine inlet

Left, Principal Engineer of Sewage Disposal, Arthur D. Caster and Superintendent of Power, Robert Mathias.

Lower level of the power house with the CFC Fulflo fuel oil filters at left and lube oil filter at right. Roper transfer pump is shown as is end of Ross lube oil cooler at top right.



inter-cooler. Water from the cooling tower basin is circulated in a closed system through the inter-cooler and when intercooler air temperatures are below 70° F., the water bypasses the cooling tower. When temperatures rise, the intercooler calls for cooler air through a thermostatic control. This control changes a three-way valve redirecting the intercooler water through the cooling tower. The higher evaporation rate supplies both cooler water to the intercooler and cooler engine air.

Of the various control systems in the plant, none, perhaps, is more important than the one that serves the prime movers directly. Supplied by Cooper-Bessemer, the system is operated pneumatically and functions automatically with individual control panels immediately adjacent to each engine. Air actuated controls are used throughout, signalled thermostatically or mechanically. Under conditions of low lubricating oil pressure, high jacket water temperature or engine over-speed the engine will shut-down. In case of failure of gas supply, the engine will immediately change to fuel oil operation. Tied in with this is an audible (horn) and visual (red light) alarm system to indicate high lube oil or jacket water temperatures, and low lube oil or jacket water pressures.

While there are no production records available at this early date, certainly there is every indication that Mill Creek power plant will fully measure up to expectations. Messrs. Caster and Mathias have already established sound procedures and employed a competent operating staff. Evidence of their pride in power plant and the other Mill Creek facilities is that fact that they will host 500 to 1000 city, state and national officials and members of the Ohio Sewage and Industrial Waste Treatment Conference which will be meeting in Cincinnati coincident with the formal dedication of the plant on June 18, 1959.

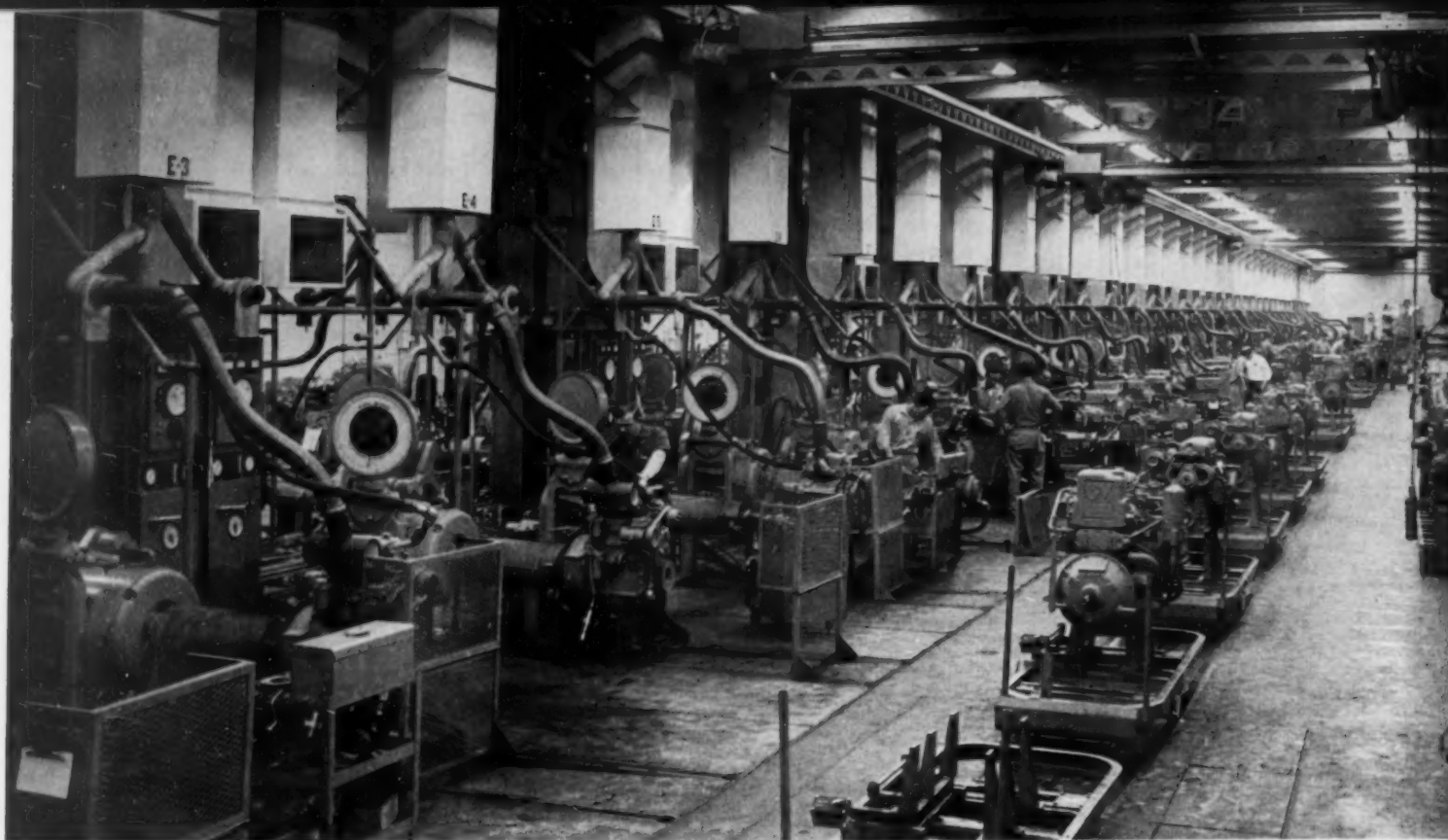
### Principal Equipment Serving 1910 HP Cooper-Bessemer Engines

Generators and exciters	.....	Ideal Electric
Intercoolers	.....	Young
Governors	.....	Woodward
Heat recovery silencers	.....	Maxim
Heat exchangers	.....	Ross
Jacket water pumps	.....	DeLaval Steam Turbine
Intake air filters	.....	American Air Filter
Evaporative cooling towers	.....	Marley (3)—Halstead-Mitchell (1)
Lube oil filters	.....	CFC Fulflo
Fuel oil filters	.....	CFC Fulflo
Thermostatic controls	.....	Amot & Fulton-Sylphon
Pyrometers	.....	Alnor
Gas meters	.....	Roots Connorsville
Gas compressors	.....	Fuller
Gas compressor lubricators	.....	Manzel
B & A lube pump	.....	Roper
Switchgear	.....	General Electric
Automatic-pneumatic controls	.....	Cooper-Bessemer
Gas regulator	.....	Fischer
Air compressors	.....	Quincy
Engine lube oil pumps	.....	Viking
Lube oil strainers	.....	Air Maze
Lube oil	.....	Sinclair
Engine fuel oil filter	.....	Purolator
Fuel oil pumps	.....	Tuthill
Turbocharger lube oil filters	.....	CFC Fulflo

temperatures exceed 165° F. The heat recovery water after passing through the jacket water heat exchanger, is piped in underground passages to each of the digesters. Here it is circulated through external heat exchangers, the sludge being circulated through the heat exchangers from the digesters. Returning to the plant, a portion of the digester heating water is circulated through the lube oil cooler before it passes through the engine jacket water heat exchanger.

Intake air for the Cooper-Bessemer engines enters the plant through curtain-type filters and passes through an attached evaporative cooling tower prior to entering each engine turbocharger and





## DETROIT DIESEL'S NEW MANUFACTURING FACILITIES

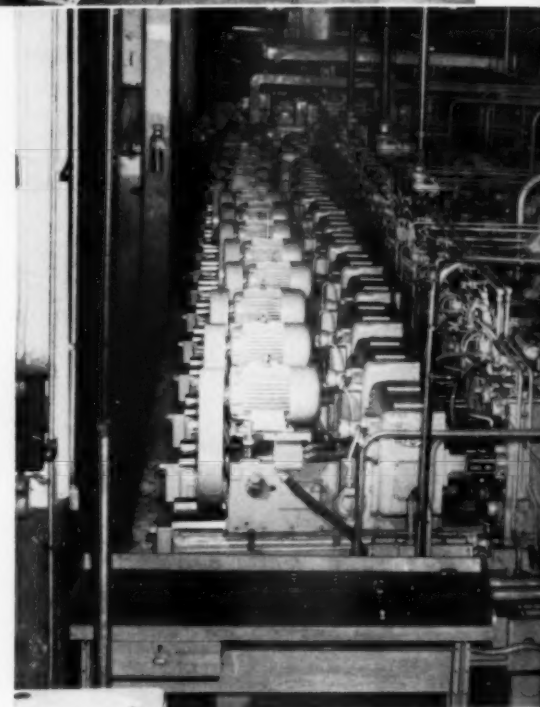
By JIM BROWN

**T**HE January 1959 issue of DIESEL PROGRESS presented the new product line announced by the Detroit Diesel Engine Division of General Motors. This new line of engines includes eight basic engines among which there are five V type engines. The new 53 series, engines of  $3\frac{7}{8}$  in. bore by  $4\frac{1}{2}$  in. stroke, is being built in 2, 3 and 4-cylinder in-line models and a V model with 6 cylinders, all in addition to the standard in-line series 71 engines and 6-110 engines. There are also new 6-V, 8-V, 12-V, and 16-V series 71 engines in Detroit Diesel's new all purpose power line.

Obviously to go from the manufacture of the in-line series 71 and 110 engines into the manufacture of such a widely expanded horsepower range and into the manufacture of V type engines at the same time meant a requirement for considerably expanded manufacturing facilities, both as to machinery and space. To provide more space, Detroit Diesel moved its spare parts warehousing to another company-owned plant in Wayne, Mich. and also put up a 280,000 sq. ft. addition to the rear of their existing plant. The space gained from the parts warehousing move and from the new building together meant a gain of approximately 30 per cent in ground floor space. Perhaps the most significant fact however is that by the adoption of literally dozens of new automatic transfer machines to replace slower and less efficient machinery, Detroit Diesel has increased its productive capacity by 60 per cent, according to C. W. Truxell, General Manager.

New machinery acquired by Detroit Diesel applies not only to block and head machining, drilling and boring, but a great many operations on smaller parts such as timing gears, connecting rods and pistons have been accelerated by the use of modernized equipment. At one spot, for example, the time-consuming hand de-burring of timing gears had been replaced by a "Mechamatic" de-burring machine which swirls twelve gears at a time through the de-burring material. The gear hobbbers, too, had been changed with new Barber-Colman, Lees-Bradner and Cleveland hobbbers knocking out gears from gear blanks at a fast clip.

On the piston production lines, I followed series 71 and series 53 pistons moving on gravity conveyors through new LeBlond and Gisholt lathes, a Reedmatic rough-grinder; Cincinnati-Bickford machines; a Bullard ring-groove cutting machine; a Cincinnati automatic centerless grinder for OD finishing; a Natco machine which roughs out and finishes the "domes"; a Borematic machine to finish-bore and counter-bore wrist-pin holes and a Kingsbury machine which drills all the oil holes leading to the ring grooves. This will give you some idea of the machinery required for one part and I may have missed one or two operations at that. After the completion of all the machining and various inspection operations all pistons go on conveyors through a tin-plating bath where wear-reducing tin is applied electrolytically before they are ready for the assembly line or for spare parts warehousing.



Passing on to the "head" and "block" machining lines I followed them through long arrays of well-known makes of milling, boring, broaching, drilling and tapping machinery. The difference between these machines and the more familiar machines which perform the same types of operations is mainly in the fact that these are all of the automatic, "transfer" type, controlled electrically from centralized locations. Towering from approximately 10 to 16 ft. above the floor and mounted solidly on concrete pads which extend to bed rock below, these machines include such well-known makes as Kearney and Trecker, Natco, Ingersoll, Fitchburg, Colonial, Cross, Foote-Burt, Greenlee, Excello, Detroit Broach, Heald and Michigan Tool. Each is a "special-purpose" machine. They are all connected by conveyors upon which the heads and

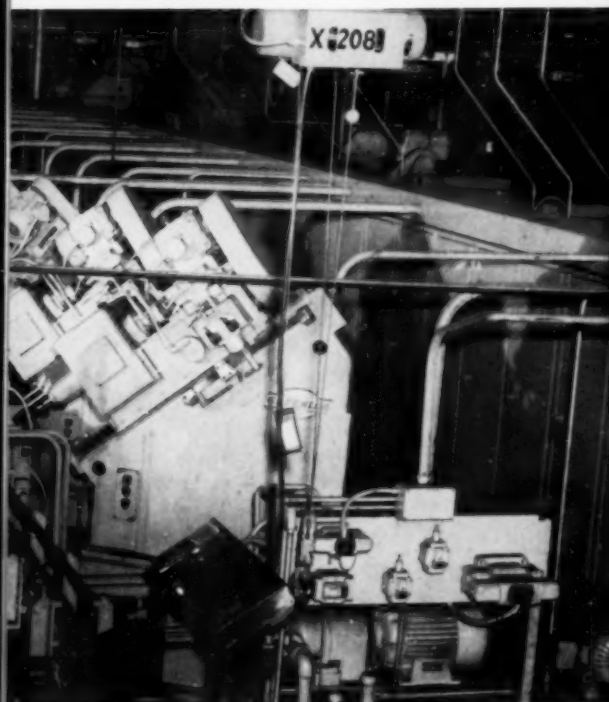


blocks are rolled from one operation to another. In two or three places during the process "roll-over" equipment turns the pieces over with ease to present a different face to the machinery.

The 53 series engine blocks, for example, go through 21 operations between the rough casting and final inspection stages and several of the machines they pass through involve from a dozen to 17 stations. Most astonishing was that by indexing (moving locations of mills, quills, etc.) all of these operations except three could be performed on both in-line and V type blocks! Cylinder-boring operations and boring water holes in the V type blocks (to connect with matching holes in the heads) are performed by three separate machines reached by conveyors looped off of the main line. GM Diesel production men told us that this was done to eliminate indexing of cylinder blocks re-

◀ View showing Detroit Diesel's long dynamometer test room which is separated from the assembly area by a wall that extends to the roof.

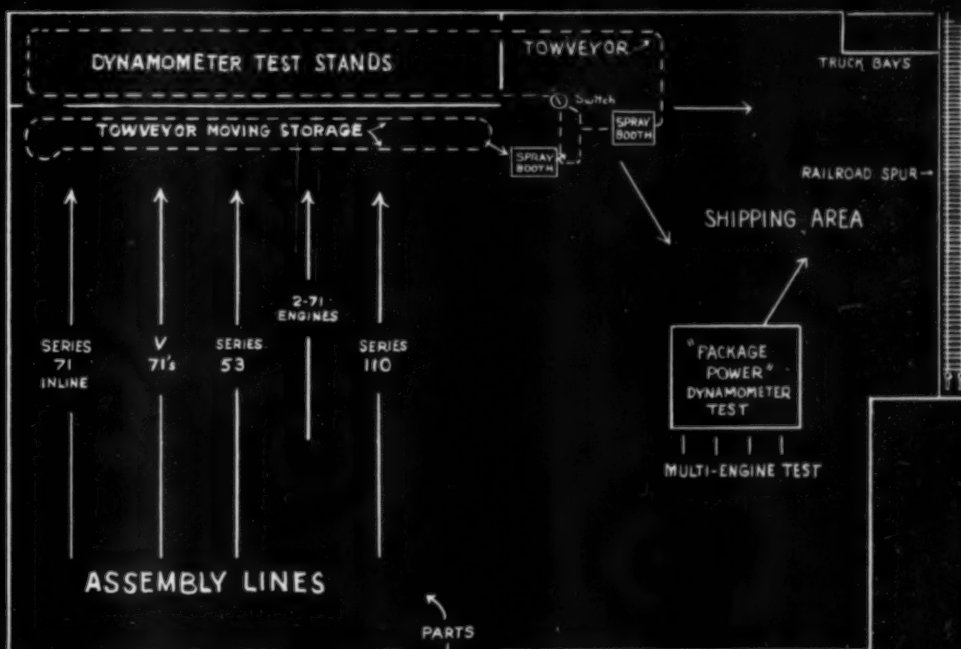
Mid-point of GM Diesel's 295 ft. series 71 inline assembly line, where engines are transferred from side-mounting overhead conveyor to platform-mounted floor-level conveyors. ▶



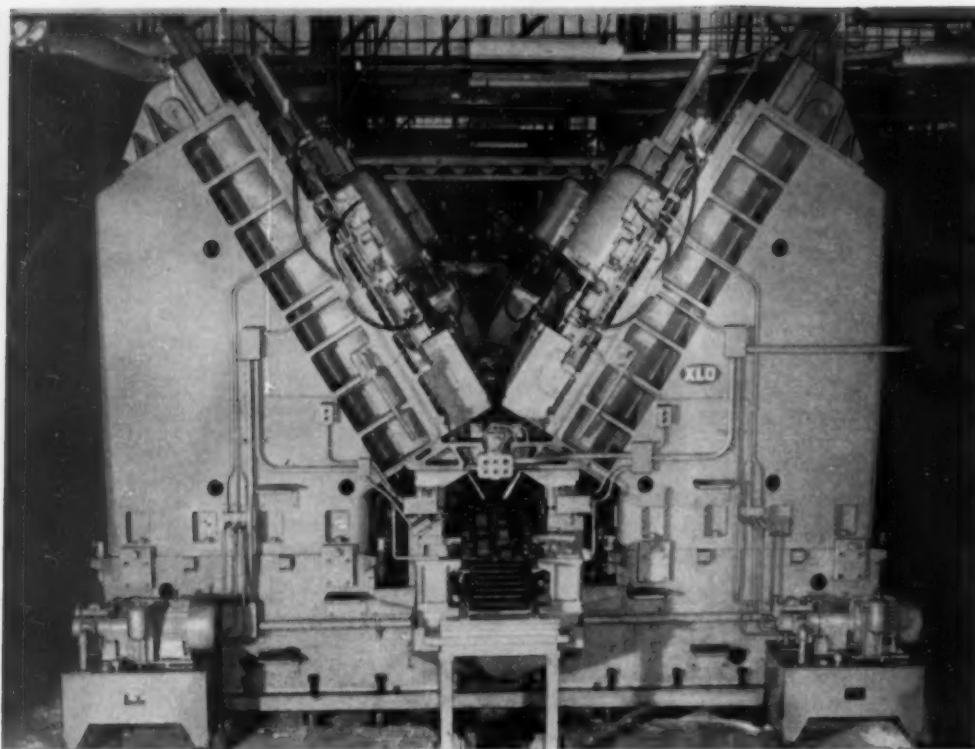
Overhead view of part of the GM Diesel cylinder head machining line showing Greenlee automatic transfer machines. ▶

Author's sketch showing general arrangement of the new GM Diesel assembly and dynamometer test building. Heavy parts are palletized adjacent to assembly lines; pistons, cylinder liners, etc. are synchronized with the assembly operations on overhead conveyors. ▶

End of series 71 inline basic engine assembly line. Nearest engine is ready to be lifted by crane to Towveyor cart for temporary "moving storage". ▶



quired on single head machine with resultant wear that would affect production quality—otherwise, all operations on the in-line and V blocks could have been performed on the same machines. On



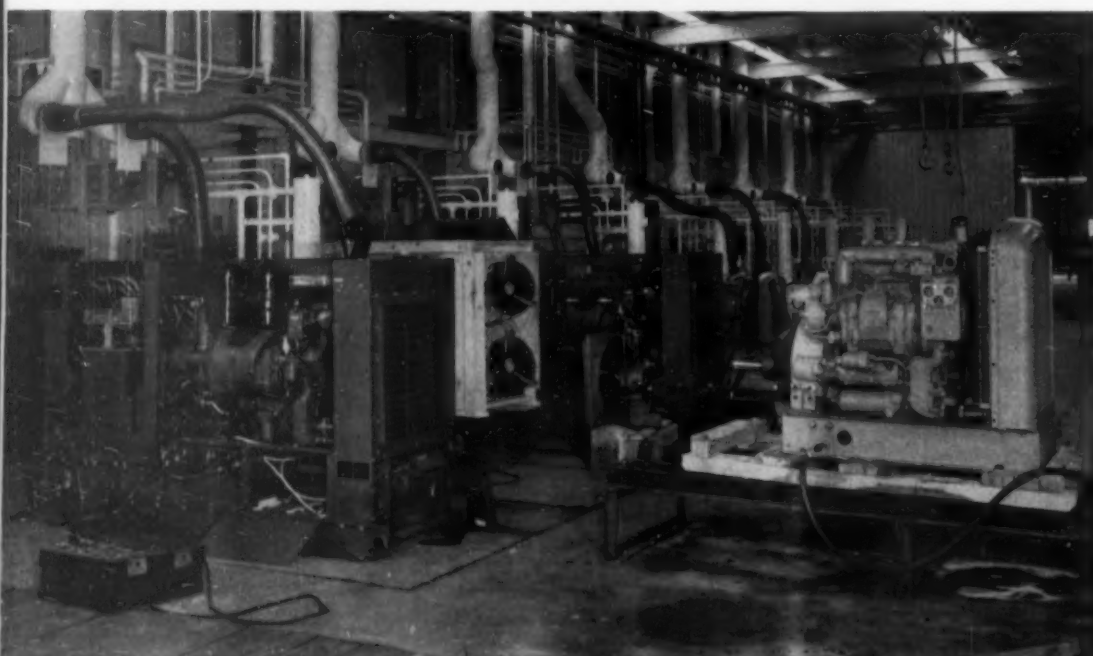
Biggest machine in the plant is this 116-ton Excello 2-station set-up for rough boring and counterboring cylinder bores in V-71 engine blocks. Footings 60 ft. deep (to bed rock) provide maximum support and rigidity. Cast-iron blocks for V-12 engines machined here weigh about 750 lbs.

the block machining lines the machines have variable speeds where necessary so that machining of both cast iron and aluminum can be performed on the same production machinery. The two "block" lines are served by a 32,000 gal. underground coolant supply into which the cutting oil and chips are returned by gravity, and there are separate supply tanks for the head machining lines. The older sections of Detroit Diesel's plant contain all of the machining operations; the new building (approximately 280,000 sq. ft.) is devoted to assembly, dynamometer testing and shipping.

Reference to Figure I will give a general idea of the layout of facilities in the new building. It includes five assembly lines, a main dynamometer testing room with stands for 70 engines, a secondary "package power" testing area which will

accommodate 14 units and multiple-engine final test stands which will hold four twin or quad engines. As the drawing shows, the five assembly lines include a line each for the series 71 in-line engines, the series 71 V type engines, the 53 engines, the series 110 engines and the 2-71 engine. The first three of these (71 in-line, 71 V and 53) are of a new type in which the engine block is first carried by a slowly moving overhead crane arrangement then lowered on to a platen-mounted conveyor. The platen-mounted conveyors, spaced out to allow ample working room all around the engines, resemble small kitchen tables turned upside down with the "legs" supporting the engine, although, of course, they are of all-steel construction and engineered to support the engines properly. These conveyors are articulated, with "blanks" between them and are flush with the floor so that no tracks

"Package Power" testing area where industrial power units and generator sets are given a second dynamometer performance test with complete equipment.



or rollers protrude to trip the assembly men. At the end of the line they disappear into the floor and reappear back at the start of this section in "endless chain" fashion.

From the assembly lines the engines, ready for testing, get a short lift by manually operated overhead cranes to a unique "moving storage" area. The moving storage consists of a number of "Towveyors" which are connected to a moving chain recessed in the floor. The Towveyors carry the engines around slowly, without further attention, somewhat like the cable cars which were once common on the streets of St. Louis and San Francisco. One loop of the Towveyor line carries assembled engines around and around outside of the dynamometer test room. The engines are lifted from this loop through a paint spray booth for a prime coat of paint and subsequently let down on a second Towveyor system which carries them through the dynamometer test room. Here again they circle around the row of 70 dynamometer test stands until they reach a free dynamometer, when they are switched off of the line, rolled into position for a crane lift to the dynamometer stand.

After the initial dynamometer test of from two to four hours given each engine, the engines are again placed on the Towveyor and carried out of the dynamometer room. They then pass through the finish paint spray booth and are subjected to an inspection procedure which involves removal of the oil pan and examination of the lube oil and pan for any stray particles of metal which might indicate the necessity for parts replacement and reassembly. Up to this point the lube oil pump intake is covered with a cloth screen to prevent any possibility of oil pump or bearing damage, but the cloth screen is here removed, having served its purpose during the run-in and performance testing. From here on the engines take different routes, depending on whether they are to be fitted out as marine propulsion units, industrial power units, automotive engines or generator sets. When the assembly of a base-mounted industrial power unit or generator set is completed it is placed on one of a separate group of 14 test stands and given a second thorough dynamometer testing to make certain of its performance as a complete unit. Four special dynamometer test stands are also provided for the twin and quad multi-engine units.

After the final dynamometer tests and final inspection approval the engines are moved via roller conveyor to the crating and shipping area. The engines are here mounted on skids, crated, or boxed for export, depending on final destination and transportation method selected. The shipping area contains five truck bays and a railroad spur, all recessed for floor-level loading and all totally enclosed by the building.

Careful examination of Detroit Diesel's new facilities for building its all purpose power line leaves the distinct impression that no effort has been spared to make this one of the most modern, flexible engine manufacturing plants possible. It also reflects, in the new building and machinery investment and the increased production capabilities, a firm faith in the continued growth of the diesel industry.



# FIRST DIESEL RAILROAD CARFERRY ON GREAT LAKES ENTERS SERVICE

By ROBERT E. SCHULZ

**M**ANITOWOC, Wis.—A new chapter in the saga of Great Lakes carferry service was started here on March 17, 1959 when the *M/V Arthur K. Atkinson* returned to service following one of the most unique reconstruction jobs in shipbuilding history. The chapter could well be entitled, "Diesels Make Their Debut," but whatever it is called, the *Atkinson* will go into the records as the first diesel propelled railroad carferry on the Great Lakes. Formerly the *Ann Arbor No. 6* and powered by two triple expansion steam engines, the "new" vessel is propelled by two 2550 hp Nordberg marine diesels driving KaMeWa controllable pitch propellers through Westinghouse reduction gears. Named after the president of the Wabash Railroad which controls the Ann Arbor Railroad Co., the *Arthur K. Atkinson* is now in daily service between her home port of Frankfort, Mich. and Keweenaw and Manitowoc here in Wisconsin. Most significantly, she is making these runs in one-third less time with greater capacity than the former steam vessel.

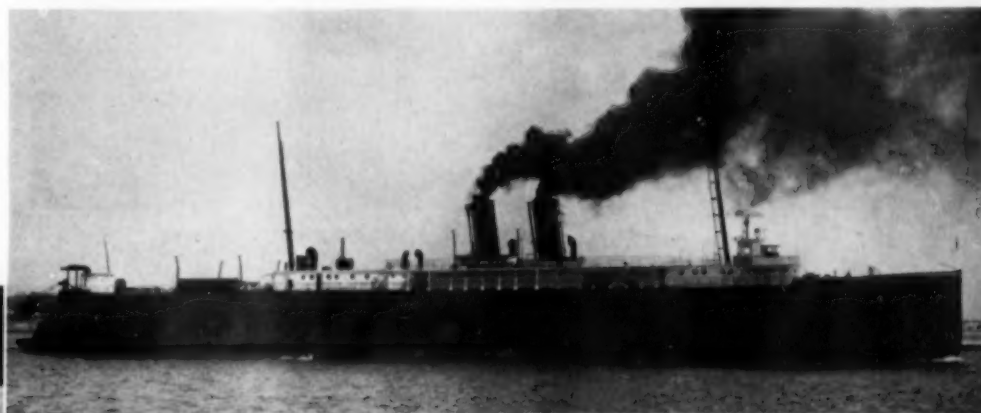
First of five carferries in the fleet of the Ann Arbor Railroad Co. selected for modernization, the *Ann Arbor No. 6* had seen 43 years of service in transporting railroad cars, automobiles and passengers between ports on each side of Lake Michigan. She made her last trip under steam in June, 1958 and was then brought into the yards of the Manitowoc

Shipbuilding Co., for reconstruction. In order to accommodate the ever increasing size of railroad cars, the vessel was not only cut in two and lengthened 34 ft., but also cut horizontally at the car deck and superstructure and deckhouses elevated 24 in. The additional height provides greater clearance and the added length increases the carrying capacity to 28 loaded rail cars. The principal characteristics before and after reconstruction are:

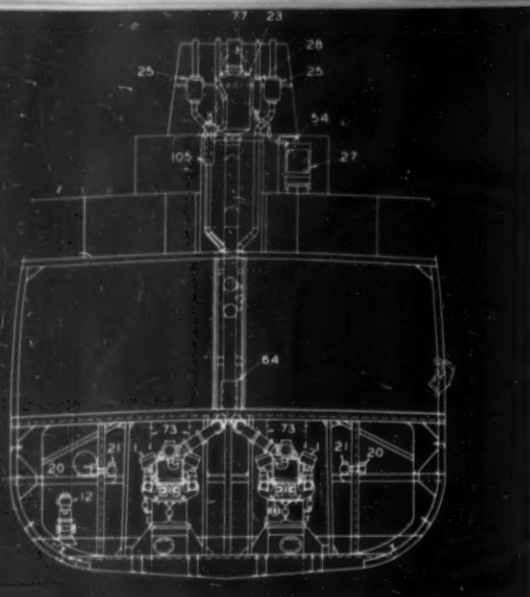
	Before	After
Length Overall	350'-0"	384'-0"
Length Between Perps.	338'-0"	372'-0"
Beam, Mld.	56'-0"	56'-0"
Depth to Main Deck	20'-6"	20'-6"
Depth to Spar Deck	38'-1"	40'-1"
Allowable Keel Draft	14'-2 3/8"	15'-6"
Main Engines (2)	Steam	Diesel
Horsepower (Total)	2,600	5,000
	Normal	Normal
Propellers (2)	1 piece, 4 blade	Controllable pitch, 4 blade
Propeller Diameter	12'-0"	12'-0"
Sea Speed	12 mph	18 mph
Freight Car Capacity	24	28

Without doubt, the *Atkinson* will have the eyes of the heavy marine shipping industry focused upon her. The economic considerations behind the decision to reconstruct and dieselize the *Atkinson* are important and her performance will be a sound basis for future repowering plans. According to E. R. Buck, general superintendent, motive power, Wabash Railroad Co., the principal reasons for modernizing this vessel was to acquire a more efficient power plant, increase the size and car carrying capacity of the vessel and increase the speed so that two trips could be made across the lake in each 24 hr. period. This definitely has been accomplished. While it is too early to establish a definite operating cost comparison, there is no doubt that the diesels are bearing out the original studies and doing the job more economically on a cost/hp basis. Adding to the economy are the savings in standby losses since the diesels may be shut down while the vessel is at rest in port and the lower cost of burning a commercial No. 4 fuel oil. The increased power is also paying off when the vessel must run under adverse conditions, especially in ice. In service 12 months a year, the vessel must operate as an ice breaking

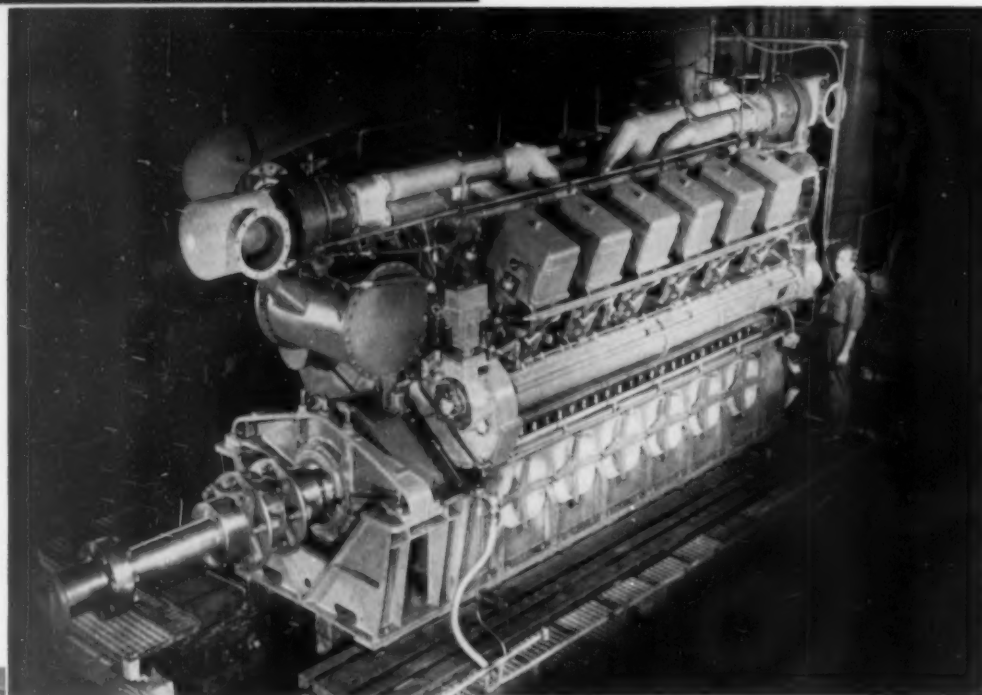
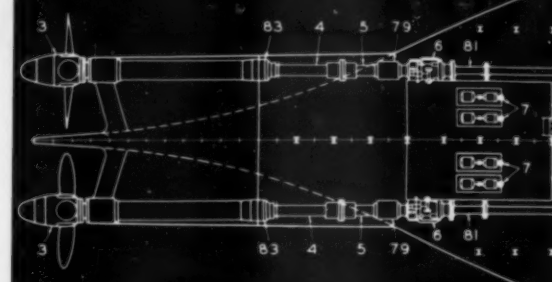
Magnitude of remodeling is fully evident in these before and after views. Smoke is no longer a problem and in addition, the Nordberg diesels have increased the vessel's speed 50 per cent.





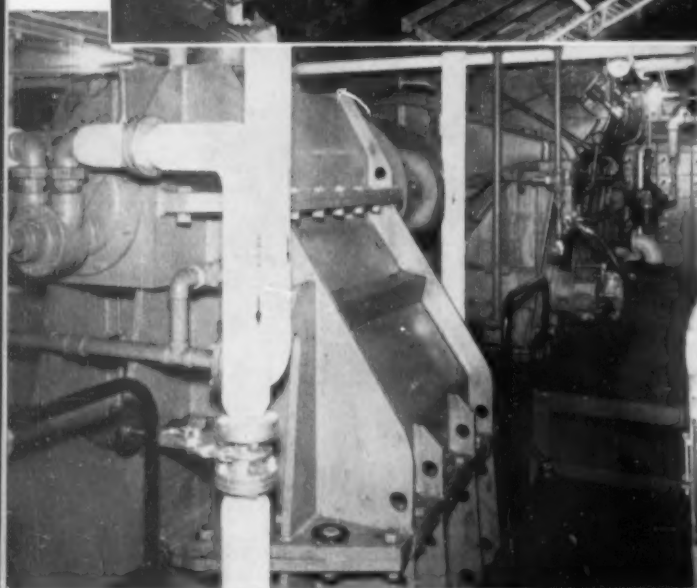


1—main engines; 2—reduction gears; 3—propellers; 4—shafts & couplings; 5—intermediate shafts; 6—pitch control transfer boxes; 7—pitch control pumps; 8, 9—operating stands; 10—hydraulic sump tanks; 11—hydraulic surge tanks; 12—main ballast pump; 13—stern tube flushing pump; 14—fuel oil burners; 15—fuel oil pumping; 16—standby R.W. pump; 17—standby JW pump; 18—standby LO pumps—main engine; 19—standby LO pumps—gear; 20—JW coolers—main engines; 21, 22—main engine & gear LO coolers; 23—exhaust silencers; 24—diesel generators; 25—exhaust silencers service; 26—JW coolers—aux.; 27—emergency diesel generator; 28—exhaust silencer; 29, 30, 31—LO storage, settling & sludge tanks; 32—LO centrifuge; 33, 34, 35—LO transfer, FO transfer & FO drain pumps; 36—FO centrifuges; 37, 38—FO sludge & drip tanks; 39, 40, 41, 42—FO centrifuge, LO centrifuge, main FO booster & aux. FO booster heaters; 43, 44, 45, 46—RW—main, RW—aux., FO, LO—main strainers; 47, 48—LO filters—main & by-pass-main;

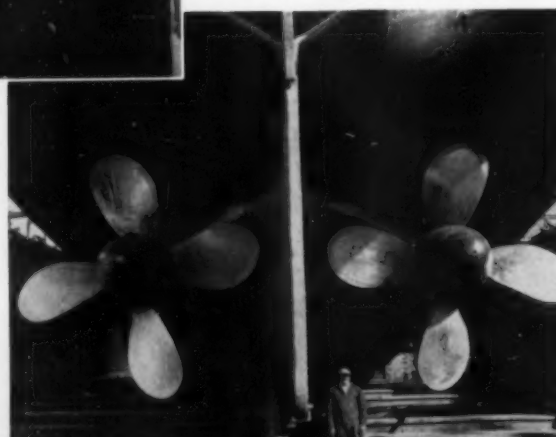


One of the two 2550 shp Nordberg diesels on test in factory. Note arrangement of dual Elliott turbochargers and Young intercoolers. Two Woodward governors are installed, one normal and the other for propeller overspeed.

Engine room of the *Atkinson* showing the Westinghouse single reduction off-set gear with 3.6:1 ratio.



The two KaMeWa controllable pitch, 4 blade propellers have a 12 ft. dia. Blades can be controlled from 16 ft. ahead to 9 ft. astern. Westinghouse Air Brake pneumatic system is used.



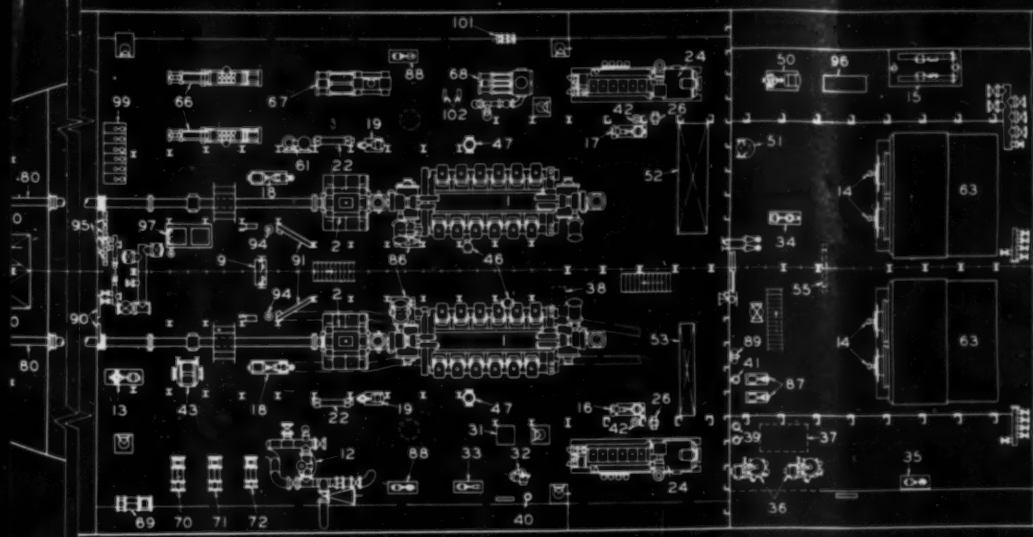
ferry usually for three months during this time and the increased propulsion power will substantially reduce retardation from this element as well as from high winds and high seas. Over and above the economic factors, but certainly not an insignificant item, is the elimination of black smoke and fly ash through dieselization. Ann Arbor, like the rest of the operators on the lakes, has been under constant pressure from the ports to solve the "black smoke" problem and the pictures on the first page of this story graphically tells what Ann Arbor has accomplished with diesel propulsion.

As stated, the vessel was originally powered by two triple expansion steam engines, each driving a cast steel, four-bladed propeller. Steam was supplied by four coal burning hand fired Scotch boilers operating at 170 psig. Reduced pressure steam was supplied to all engine room auxiliaries, deck machinery and heating systems. Steering was by a steam driven geared quadrant steering engine controlled by shafting from the forward pilot house. Astern steering, when backing into a slip, was accomplished by working the main engines upon telegraph orders from the after pilot house.

Supplying the propulsion power for the *Arthur K. Atkinson* is a pair of Nordberg four-cycle model FS-1312-HSC non-reversing turbocharged marine diesels with a normal rating of 2550 shp each at 468 rpm. These engines are of the V-type with 12 cylinders of 13 in. bore and 16½ in. stroke and operate on the Supairthermal system which principally incorporates high pressure turbocharging, intercooling of intake air and variable inlet valve timing control. Each Nordberg engine drives a KaMeWa controllable reversible pitch propeller through a Westinghouse single reduction vertical off-set gear with a ratio of 3.6:1. This provides normal rated horsepower at 130 shaft rpm and 2850 shp at 135 rpm for operation at continuous full power; Emergency overload, 3000 shp, 139 rpm.

Power for ship's service aboard the *Atkinson* is provided by a pair of model 40-SX-6 diesels built by the White Diesel Engine Division of White Motor Co. These six cylinder, turbocharged engines, installed port and starboard fore of the main diesels, each drive a 300 kw, 375 kva, 240 volt, 3 phase Ideal Electric generator at 900 rpm. An Allis-Chalmers model 6 DA6844 100 kw diesel

**DIESEL PROGRESS**



49—LO strainers; 50, 51—fire & emergency bilge pumps; 52—switchboard-aux.; 53, 54—distribution-aux. & emergency distribution boards; 55—combustion control panel; 56—fans; 57—whistles; 58—combustion controls; 59—air compressors; 60—air tanks; 61—air compressors; 62—air tank; 63—boilers; 64, 65—JW surge tanks; 66, 67, 68, 69, 70, 71, 72—pumps; 75, 76, 77—vent supply fans; 78, 79—line shaft bearings; 80, 81, 82—line shafting; 83—stern tubes bearings & stuffing boxes; 84—CO<sub>2</sub> system; 85—crankcase exhaust fan; 86—turbocharger LO set; 87—FO booster pumps; 88—LO by-pass filter pumps; 89—FO filter; 90, 91—propeller & main engine gauge boards; 92—propeller control stands; 93—inspection tank; 94—engine starting stands; 95—starters-prop. hyd. pump motors; 96—cubicle-boiler room; 97—filter tank; 98—cubicle-ventilation; 99—oil tanks; 100—hydraulic valve manifolds; 101—chemical feed pump; 102—injectors; 103—emergency diesel FO tank; 104—feed water heater; 105—aux. exhaust water catcher.

generator set is installed for emergency power and is housed at the base of the stack.

The main engines and auxiliary diesels operate on #4 commercial fuel oil which is taken on in Frankfort and stored in two main tanks and two wing tanks having a total capacity of 56,500 gals. Light diesel fuel, #2, is used for start-up and shut-down service. The main engines have independent motor driven fuel booster pumps. The generator engines have attached pumps. All engines have booster fuel heaters for independent control of engine fuel temperatures. All #4 fuel is heated to 100° F. in storage, pumped to one of two 600 gph centrifuges, cleaned at this temperature and then pumped to storage in either of two day tanks, each having a capacity of 2500 gallons. Heavy fuel to the engines is from day tanks only and under current operating conditions fuel is delivered at 120° F. The main engines have dry crank-cases, and drain into lube oil sumps built into the foundations. Each sump has a capacity of about 1200 gals, but normally carries about 900 gals. Each attached lube pump has a capacity of 400 gpm and draws from sump tank and discharges through an oil cooler and a lube oil filter to the engine. A continuous by-pass filter with motor driven pump and electric heater is fitted for each engine and operates continuously. The main lube stand-by pump is fitted for pre-lube and after-lube service and is also automatically controlled by low oil pressure. Each reduction gear has a self-contained lube oil sump having a capacity of about 65 gals. and is served by an attached pump with motor driven stand-by pump. Each gear has separate lube oil piping, strainers and cooler. The generator engines have self-contained lube oil systems with built-in sumps and attached pumps, strainers and coolers. No stand-by equipment is fitted.

A lube oil centrifuge with attached service pumps having a capacity of 285 gph is installed on the starboard side of the engine room. Piping is arranged so that centrifuge has suction from all engine sumps, gear cases and lube oil settling tank, and discharges to all engine sumps, gear cases and to clean oil storage tanks. All oil is heated before centrifuging. A motor driven lube oil transfer pump transfers oil from each engine sump and gear case to the settling tank, and also from the settling tank to a hose connection on car deck. Two clean oil storage tanks and one dirty oil settl-



One of two White auxiliary diesels that drive 300 kw Ideal Electric generators. General Electric switch gear is at left. DeLaval lube oil centrifuge at far right.

Foreground is KaMeWa engine room control stand with separate Nordberg engine gauge boards right and left. Each hold Alnor pyrometer.

ing tank, each of 1200 gal. capacity, are fitted in the boiler room. Each tank is steam coiled for temperature control.

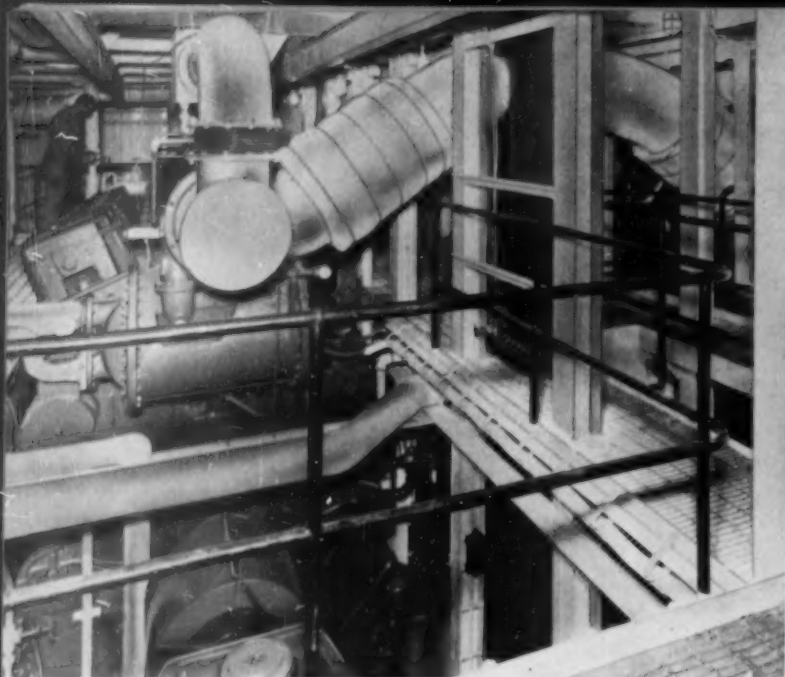
Power from the main engines is transmitted to the reduction gears through a flexible coupling. Original line shafting and bearings were reinstalled. The shafting was realigned and makeup lengths added to suit the new engine arrangement. The KaMeWa propellers were furnished each complete with intermediate shaft and oil transfer box, tail shaft with cast steel hub and four stainless steel blades. The propellers are 12 ft. in diameter and blades can be controlled from 16 ft. ahead pitch to 9 ft. astern pitch; the pitch changing hydraulic cylinders located in the hubs. New stern tubes were installed, each having inboard and outboard bearings supplied with circulating water by a separate motor driven pump.

The pneumatic engine-propeller control system on the *Atkinson* is similar in many ways to the system installed on the *Ranger III* (see DIESEL PROGRESS, Jan. '59). This system is produced by Westinghouse Air Brake working in conjunction with Bird Johnson, manufacturers of KaMe-

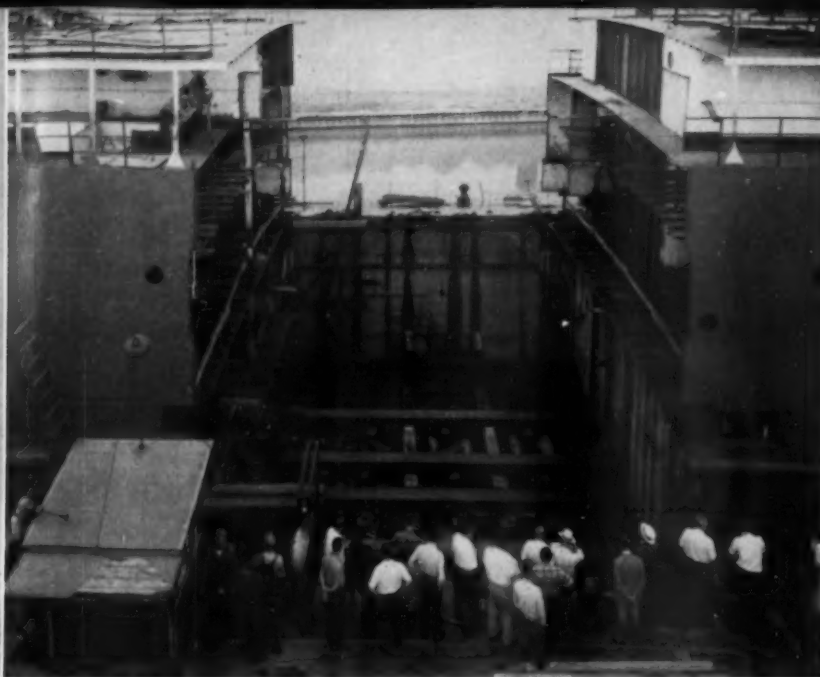


Wa equipment. It automatically and remotely controls propeller pitch and engine speed. Control air at 100 psig. is supplied to the propeller pitch control consoles, to the engine starting stands and to all remote reading tank level indicators. Control stations are located in the forward and after pilot houses and the main engine room. Each control console has a single lever which controls ahead or astern pitch and integrated engine rpm, and a pitch indicator dial for each shaft. Consoles are identical except that transfer of control from forward, aft or engine room can be made only from the engine room console. And the latter is the only console where propeller pitches and engine speeds can be controlled manually and independently of each other. Normally when control is in either of the pilot houses, the pilot can get only





Engine room top platform shows compact installation of Nordberg diesels. Thomas coupling is used between engines and gears. Intake air filter is Burgess-Manning.



During reconstruction, vessel was cut forward of boiler room and 34 ft. section added. Spar deck was also raised 24 in. to provide clearance for high railroad car loadings of the present.

about 80 per cent power, a safety factor to prevent overloading when running in ice. Should full load, overload and/or extra rpm's be required, this can be handled by manual control in the engine room. In addition to their normal operating governors, each propulsion engine is fitted with an overload governor which at an established overload conditions immediately reduces propeller pitch. Control is very accurate, with fast response, considering that the forward pilot house console is about 300 ft. forward and about 45 ft. above the control points in hold No. 6 where the oil transfer boxes are located. Each propeller is operated hydraulically with pressure supplied by two motor driven pumps, one working and one standby, for each hub. Oil is supplied from and returned to separate sump tanks, each having a capacity of 410 gals.

As mentioned two of the four boilers were retained and converted to oil with the system arranged to burn #4 or #2 fuel. A hydraulic combustion control is fitted to control either or both boilers. Burners are wide range steam atomizing and normally burn uncentrifuged fuel drawn from heavy fuel bunker low sections. Only one boiler is required at any time, both boilers being a stand-by to each other. The fuel oil centrifuges, centrifuge fuel oil heaters, main engine fuel booster pumps and heaters, the fuel oil transfer pump and the fuel oil drain pump are installed in the boiler room. The fuel oil drain pump has suction from all fuel tanks and bunkers, and from fuel oil centrifuge sludge tanks, the lube oil centrifuge sludge tank, the lube oil and fuel oil drip tanks and the lube oil settling tank. Discharge is to the heavy oil bunkers and to a hose connection on car deck. All diesel engine exhaust silencers are located in the stack. Combustion air for the main engine is drawn from the upper part of the car deck, through a trunk and suitable ducts to each turbocharger inlet. The generator engines draw direct from the engine room.

Let's look at the extent of reconstruction. In order to provide additional carrying capacity the vessel was lengthened 34 ft., which was the maximum amount the American Bureau of Shipping would

allow on the basis of length/depth ratio. The vessel was cut just forward of the boiler room and pulled apart in dry dock on sliding ways constructed especially for this purpose. The new 34 ft. section was built in place while the ship remained in dry dock, and the vessel was re-floated as soon as the old and new sections were joined together. The new section was all welded with the exception of the riveted seams noted on the mid-ship section. The fuel oil bunkers were built into the new section to avoid the difficulty of trying to add them into an existing part of the hull.

Three new watertight bulkheads were added during the process of reconstruction. The forward two new bulkheads were installed to cut the old holds No. 1 and 2 into two holds each so as to be within the permissible floodable length, and it is the presence of these new bulkheads that accounts for the 15 $\frac{3}{8}$  in. increase in allowable draft. The third new bulkhead was in effect a relocation of the old after boiler room bulkhead. The old bulkhead dividing the engine room and boiler rooms was removed, and the new bulkhead installed 18 ft. farther forward to lengthen the engine room. The old pilot house and stacks were removed and replaced with new enlarged and streamlined units. For the sake of modernizing the exterior appearance, streamlined fashion plating was added between the spar deck and boat deck to hide the existing stanchions at the ship-side. The stern profile above the sea gate was also revised and a new painting scheme was adopted.

Indeed, in her appearance, construction and power, the *Atkinson* has all of the elements for successful operation. The Ann Arbor Railroad Co. and its engineers are to be commended for the foresight and high standards they have established and their confidence in making this outstanding vessel the first diesel-propelled car ferry on the Great Lakes.

#### List of Principal Equipment

##### Main Propulsion

Engines ..... Nordberg

Reduction gears ..... Westinghouse  
Controllable pitch propellers ..... Bird Johnson  
Flexible couplings ..... Thomas  
Thrust bearings ..... Kingsbury  
Turbochargers ..... Elliott  
Intercoolers ..... Young  
Governors ..... Woodward  
Pneumatic controls system

..... Westinghouse Air Brake  
Main switchgear ..... General Electric  
Fuel oil centrifuges ..... DeLaval Separator  
Lube oil pumps ..... Roper  
Fuel oil transfer & booster pumps

..... DeLaval Steam Turbine  
Fuel oil heaters ..... Ross  
Fuel oil duplex filters ..... Nugent  
Fuel injection ..... Bendix-Scintilla  
Lube oil & jacket water coolers ..... Ross  
Lube oil strainers ..... Purolator  
Lube oil by-pass filters ..... Winslow  
Lube oil filter pumps ..... Roper  
Lube oil transfer pumps & centrifuges

..... DeLaval Separator  
Lube oil heaters ..... Ross  
Turbocharged lube oil filters ..... Nugent  
Air compressors ..... Quincy  
Exhaust silencers ..... Kittell  
Intake air filters ..... Burgess-Manning  
Pyrometers ..... Alnor  
Lube oil temperature controls ..... Amot  
Jacket water temperature controls

..... Fulton-Sylphon  
Standby lube oil pumps ..... Tuthill

##### Ships Service

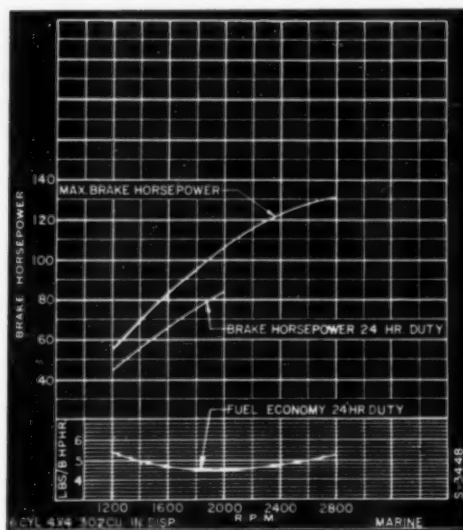
Engines ..... White Diesel  
Generators & Exciters ..... Ideal Electric  
Turbochargers ..... Elliott  
Fuel injection ..... American Bosch  
Lube oil filters ..... CFC Fullflo  
Lube oil pumps ..... Tuthill  
Strainers ..... Purolator  
Fuel oil filters ..... Nugent  
Jacket water coolers ..... Ross  
Fuel booster heaters ..... Ross  
Intake air filters ..... Air Maze  
Exhaust silencers ..... Maxim



# WAUKESHA'S 85 HP NAVIGATOR

**New Marine Diesel Engine Introduced at 1959 Miami Boat Show  
Is Designed for Twin Screw Pleasure Boat Installation and for  
Powering Commercial Fishing Vessels**

**L**ATEST addition to Waukesha Motor Company's line of marine diesel engines is the new six cylinder 302 cu. in. Navigator. Now being produced for both commercial and pleasure boat applications, the engine is available either normally aspirated or turbocharged with respective 24 hour duty ratings of 65 and 85 hp at 2000 rpm. The Navigator was introduced at the recent Miami Boat Show where it received favorable acceptance and Waukesha will shortly launch an extensive marketing campaign. Target in the pleasure boat field will be cruisers of 36 to 42 ft. well suited to twin screw propulsion. In work boats, the engine will be applied to small oyster, lobster, and shrimp boats, seiners and other similar craft under 30 ft.



Specially built for rugged marine service with the operator in mind, the Navigator is compact, weighs approximately 1550 lbs. and affords good accessibility to accessory equipment as can be seen in the product view below. The new diesel is of the four-cycle type with overhead, stellite faced intake and exhaust valves, and has a 4 in. bore by 4 in. stroke. Seven main bearings of 2 5/8 in. dia. are provided with hardened main journals and crankpins, precision type bearing shells and extra deep bearing caps. Piston pins are full-floating and oil-cooled aluminum alloy pistons with five rings (3 compression-2 oil control) are used. Following are the principal systems and components:

**Cooling System**—Belt driven, centrifugal water pump and by-pass flange-mounted at the front of the cylinder block. Expansion tank. Engines engineered for heat exchanger or keel cooling. Gear-driven raw water pump.

**Lubrication System**—Full pressure lubrication by positive gear-type pump through large drilled passages to each main, camshaft, connecting rod, piston pin, piston crown, rocker arm, and to idler gear stud and gears. Valve mechanism and cylinder walls drenched by oil mist. Oil cooler on cylinder block with automatic by-pass. Adjustable pressure regulator. Large capacity oil filters.

**Fuel Injection System**—Roosa-Master gear-driven injection pump with drawn steel injection lines to single orifice pintle-type nozzles. Roosa primary feed pump with hand primer mounted on injection pump. Large capacity fuel oil filters.

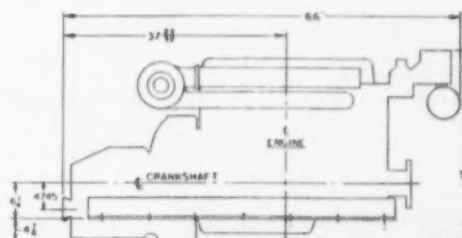
**Governor**—Variable speed, centrifugal mounted on and driven by injection pump. Fully enclosed, self-lubricating.

**Instruments and Controls**—Oil pressure and water temperature gauges and alarm cut-off switches. Starter switches, instrument panel, tachometer drive; pyrometer when specified. Other accessories and equipment available when specified.

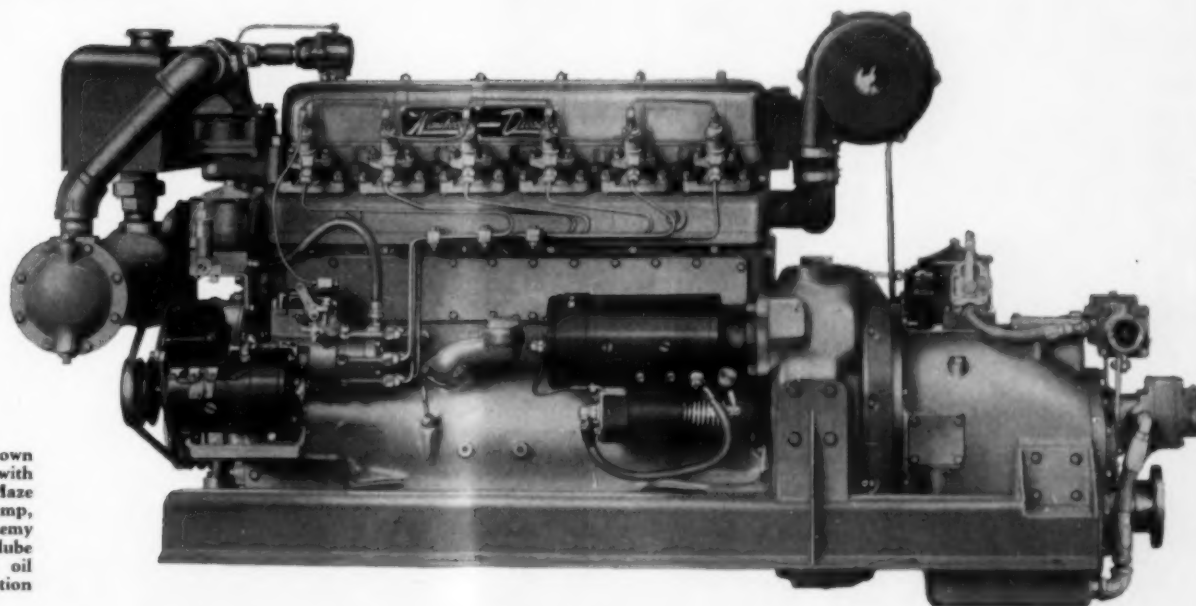
**Starting**—12-volt electric starting motor with switches, ammeter, ring gear, generator and regulator; or air starting available.

**Reverse and Reduction Gears**—In sizes and ratios to match service requirements.

Schematic installation diagram.



Performance curves of the 85 hp, 2000 rpm turbocharged Navigator.



Here is the 85 hp Navigator as shown in Miami. This engine is equipped with AiResearch turbocharger, Air-Maze air filter, Roosa-Master fuel pump, Young heat exchanger, Delco-Remy electrical equipment, Commercial lube oil filter, Winslow turbocharger oil filter and Capitol 2.055:1 reduction gear.

# 800 HP SHIFTER ENTERS ALTON POOL SERVICE

By LOUIS REITZ

**S**INCE it costs up to \$200.00 an hour to operate a large towboat on the "river" (the Mississippi, Missouri, Ohio etc.) and because they are also rather cumbersome to handle in such close quarters, most operating companies generally hire a small boat called a shifter to do the work of making up their tows so that they will be ready to go when the large boat gets into port with the inbound tow. A boat of this type might be likened to the familiar "yard goat" or switch engine used by the railroads. Norman Bros., Inc. of Alton, Ill. operate a fleet of such boats on the Alton pool which comprises the "lake" behind lock and dam No. 26 (mile 203 on the upper Mississippi).

These shifters must be sturdy craft and have power to spare in order to swing the heavy laden barges drawing up to 8 ft. or better, or empties setting on the water with a 12 ft. freeboard broadside to the wind. Considering that the average barge is 25 x 195 this sometimes takes a bit of doing. Having had excellent service from their M/V *Alton* which "came out" in 1949, they ordered their new boat from Missouri Valley Steel, made along the same lines, with, of course, certain items brought up to date. This boat which has been christened the *Piasa* (pronounced Pie-saw) is 59 ft. long and 21 ft. in the beam. Being 6 ft. 9 in. in depth, she has about 2 ft. freeboard along the "guards".

She is powered by two model VT-12-M Cummins diesels rated at 410 hp at 1,800 rpm which gives her a continuous output of 820 hp. Engine silen-

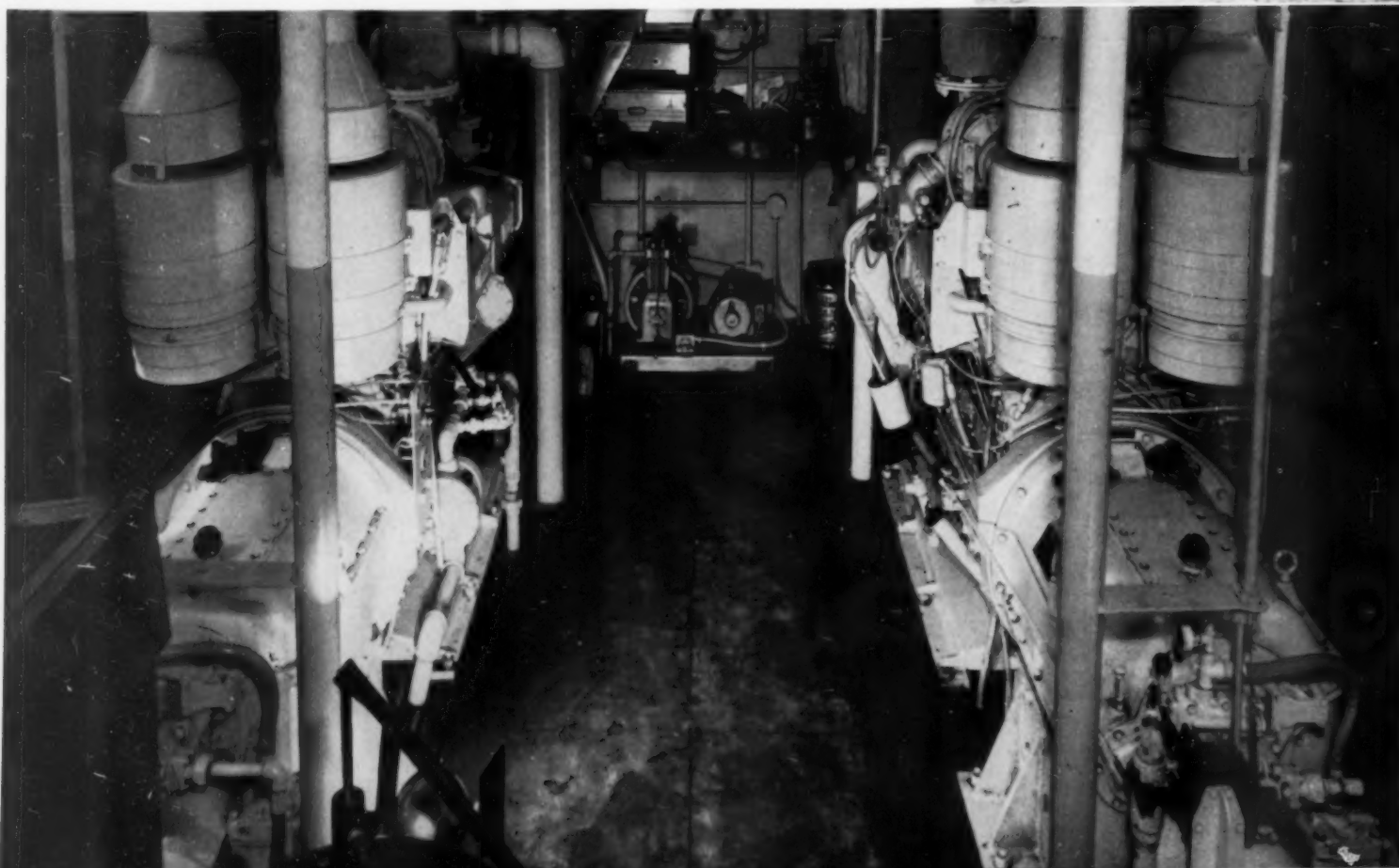
cers are installed above the engine room deck (roof) and the shrouds that cover them, form the familiar "stacks". The auxiliary generator is a Cummins model J, four cylinder job rated at 30 kw which furnishes both 110 and 208 volts (60 cycle AC). Engines are cooled by means of keel coolers. The reverse reduction gears are model MG521 Twin Disc, with a ratio of 4.08:1, and are hydraulically actuated. Controls have engine room releases so that engines may be controlled below deck during warmup. Her two 52 x 36 in. wheels built for this vessel by Coolidge have an extra 300 sq. in. of surface for better bite when starting against the inertia of a barge dead in the water.

There are two main or steering rudders mounted aft the wheels and four smaller flanking or backing rudders set alongside the shafts ahead of the wheels. This gear must be built to stand a lot of abuse because it seems that in all harbors the shoal water near the bank is usually full of old

"wires" (wire rope used to make up a tow), that have been discarded and can really play hob with a boat. All six rudders turn in roller bearings mounted on the main deck. Each set of rudders has a hydraulic cylinder furnished with oil by an individual Vickers hydraulic pump each driven by a main engine. There are also two electrically driven hydraulic pumps for emergency steering should either main engine be stopped.

The *Piasa* broadside on in the Alton Lock. This gives relative size of her towing knees. "Poop deck" aft covers hydraulic gear that controls rudders.

Two 410 hp, 18000 rpm Cummins VT-12-M turbocharged diesels drive 52 x 36 in. wheels through MG-521 Twin Disc hydraulic reduction gears. Air duct set high, extends across room and has Air Maze screens at both ends. Separate systems carry this air to each of the four Vortex intake filters.







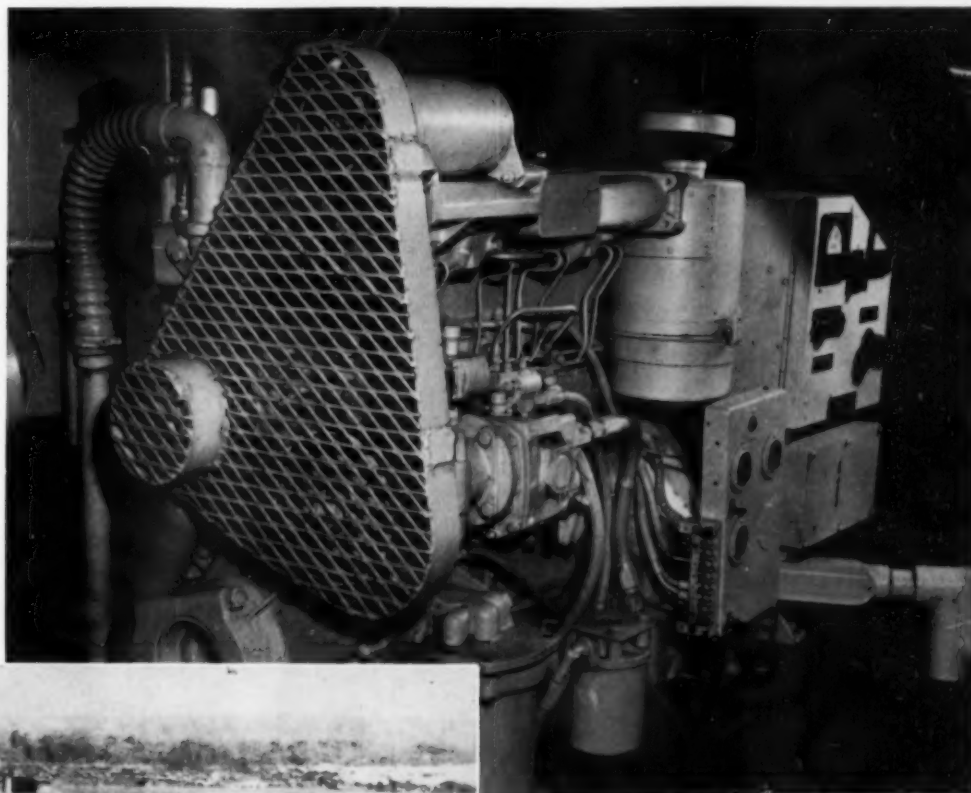
It's said that towboats run on a combination of diesel fuel and coffee. Here owner Charles Norman has his mid-morning cup.

The *Piassa* gets her identifying characteristic from her two towing knees, which stand some 13 ft. above the fore deck. This extra height is very handy when shoving empties around in the ice which is usually found in the Alton pool in the winter months. Another innovation seldom found in river towboats which have a square stern is the rounded off after end designed to part the ice cakes when backing instead of trying to ride them down and foul the gear.

Prominently displayed on the forward bulkhead of the pilot house is a painting of the famed Piasa Bird, from which the region and the boat take their name. The original painting of this horren-

dous creature on the limestone bluffs on the east side of the Mississippi just above Alton, just about scared the wits out of MM Marquette and his party of explorers when they first saw it while coming down the Father of Waters. The oriental style of the painting gives strong backing to the theory that people from Asia came through here long before the early explorers. (The present painting on the bluff is a reproduction.)

Engine controls and complete instrumentation for the engines, mounted on the control stand in pilothouse make the vessel completely operable from that center. A four point pyrometer on the consol enables the operator to keep an accurate check on the main engine exhaust temperatures. Deck fittings include two 15-ton barge connectors, an 8 in. roller chock, and three 32 in. cast steel



▲ Cummins J-4-G diesel, equipped with packaged automatic controls, drives 30 kw Marathon generator.

◆ The twin screw *Piassa* was designed and built by Missouri Valley Steel, Inc. Leavenworth, Kansas.



levels ranged along each side. There is a double towing bit forward between the knees and another on the after end. The living quarters are on the second deck and the galley section is equipped with a six cubic foot refrigerator, a four-burner range with oven, (both operated by bottle gas), and a sink with cupboard space below. There are two double berths with drawers under, on the port side.

Owner Charles Norman says the vessel has been giving good service and got her shakedown in the ice in February running down a string of barges that broke loose when ice floes coming out of the Illinois River parted their mooring wires. The *Piassa Bird* was said to fly around in this same fashion snatching up Indian kids.



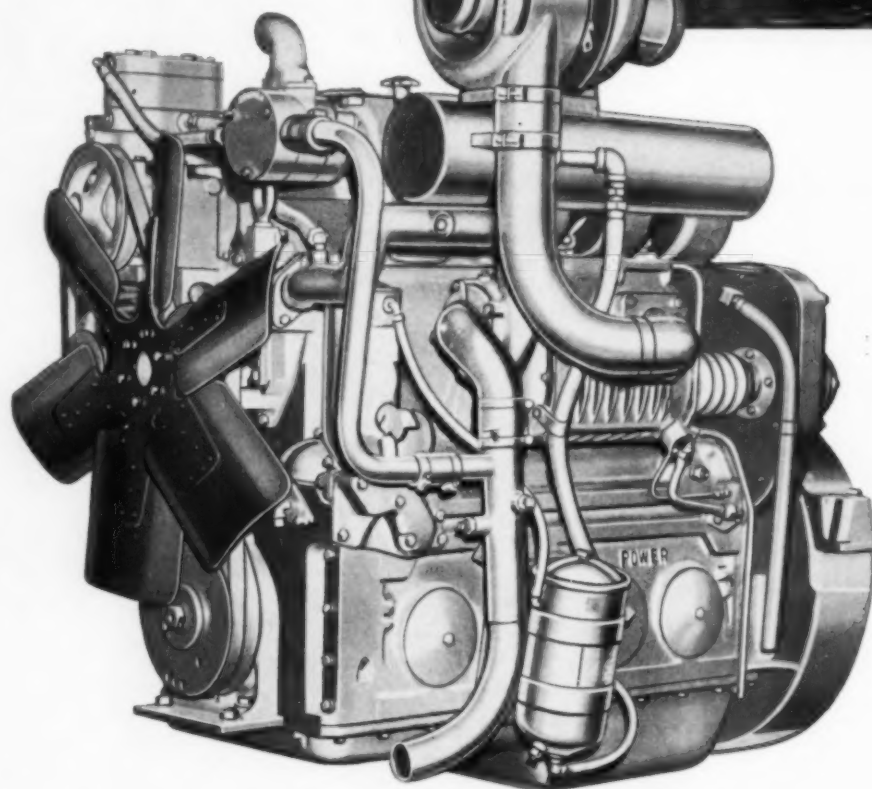
# NEW P&H TURBOCHARGED DIESEL LINE

**A** NEW line of two-cycle turbocharged diesel engines, developed for broad application in the automotive, industrial and marine markets, is now in production at the Crystal Lake, Ill. plant of Harnischfeger Corporation's P&H Diesel Engine Division. Available in three, four and six cylinder models ranging from 75 to 330 hp, the engines have exceptionally good performance in their operating speed range of 1200 to 1800 rpm. Development of the new turbocharged line started several years ago following P&H's original introduction of turbocharged two-cycle diesels. In the last two years, the pace of research, design and testing has been measurably stepped-up with important improvements made in increased fuel economy and power, and further reduction in the ratio of engine weight to horsepower output.

Since the P&H diesel operates on the two-cycle principle, air is compressed by a Roots type blower into an air box surrounding the cylinders. This air enters the cylinder through two rows of ports uncovered by the piston near the bottom of its stroke and scavenges the exhaust gases through a single large valve in the head. Increase in horsepower provided by P&H turbocharged engines is achieved in two ways: by compressing air to the blower and by increasing scavenging efficiency.

The turbocharger on the new P&H engines is connected in series with the blower. Blower intake air is, therefore, compressed by utilization of exhaust gases. As a result, the blower speed has been substantially reduced on the turbocharged model and much of the power saved is made available at the flywheel. Further gains in horsepower are realized by an increase in the amount and pressure of scavenging air, thoroughly exhausting the

cylinder and charging it with clean air for maximum combustion efficiency. As a result, P&H turbocharged engines increase horsepower parasitically by increasing the overall efficiency of the engine. P&H turbocharged engines are conservatively rated at a 27 per cent increase in horsepower, however, test results show as much as a 60 per cent increase in maximum horsepower is available. Further, the turbocharged engines develop high torque over an operating range of 1400 to 1800 rpm and retain their high torque characteristics from half load to full load conditions. Note the

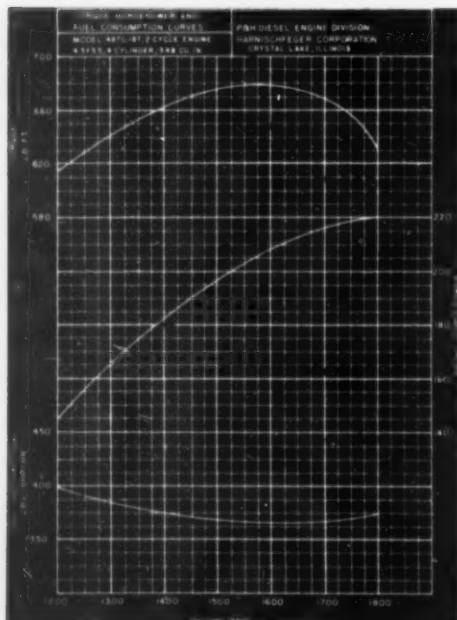


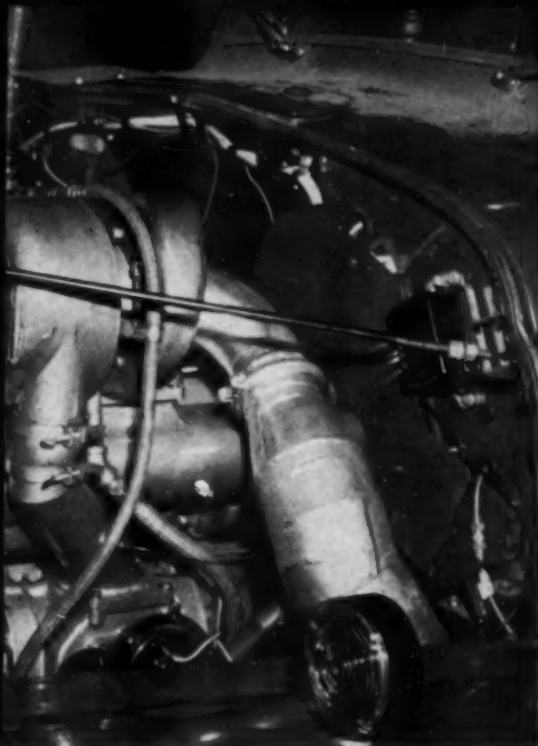
performance curve illustrated for the four cylinder, 348 cu. in. model 487C-18T.

The new turbocharged line of P&H engines, although basically the same as the non-turbocharged line, incorporates many differences which make the engines especially designed to handle the increased power without increasing thermal loads or peak pressures. Engine components affected by the addition of the turbocharger are all precisely matched and balanced. These components include: blower, turbocharger, timing of injectors and valves, and the design of manifolds. The air to fuel ratio on the turbocharged engines is designed to be approximately 30 to 1. This ratio is roughly twice the quantity of air necessary for burning the injected quantity of fuel. It is this quantity of pressurized excess air readily available to carry increased loads, with a corresponding increase in fuel, that gives the turbocharged diesel instant response.

P&H model 487C-18T for automotive applications showing Schwitzer turbocharger and blower, and Puro-lator lube oil filter.

Explorer built by Blount Marine Corp., Warren, R. I. powered by P&H 687C-18T. Length 62 ft., beam 17 ft. and draft 5 ft.

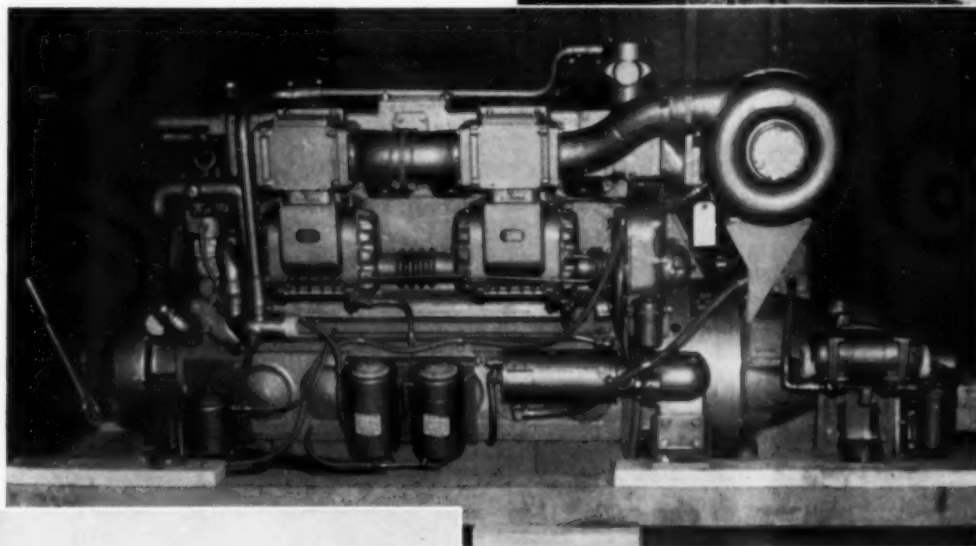




P&H 487C-18T installed in tractor for G.C.W. rating of 65,000 lbs. Spicer 12 speed Transmission is used.

Exhaust valve timing is retarded 10° permitting the exhaust valve to be open for 22° after the closure of the air intake ports by the piston. Cooler operation of the exhaust valve and more positive scavenging is thereby accomplished. Test results show that the heat rejection rate to cooling water on the turbocharged engines is actually 25 per cent less than with the P&H non-turbocharged line of equal horsepower. Retarding the valve timing also tends to lower the peak firing pressures but at the same time increases the expansion ratio.

Aluminum P&H crankcase passing thru special milling machine.



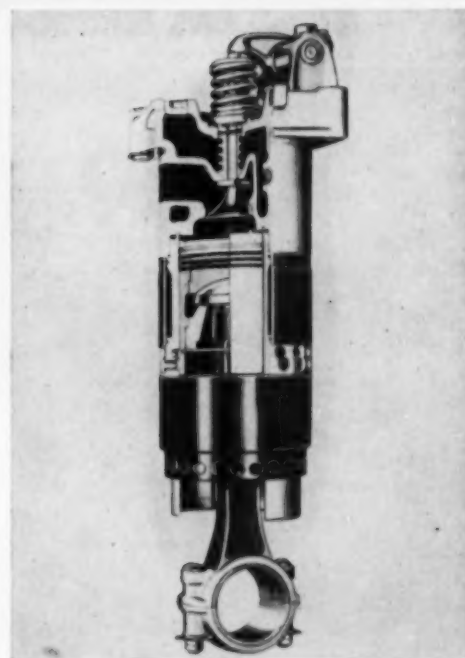
P&H model 687C-18T marine diesel with rear mounted Schwitzer turbo-charger and Twin Disc clutch power take-off and reduction gear drive. Delco-Remy electrical equipment and Purolator filters are used.

P&H power assembly showing "mush-room" connecting rod. This design allows the piston to rotate during operation distributing wear evenly to liner and piston. It offers three times the bearing surface of conventional wrist pins.

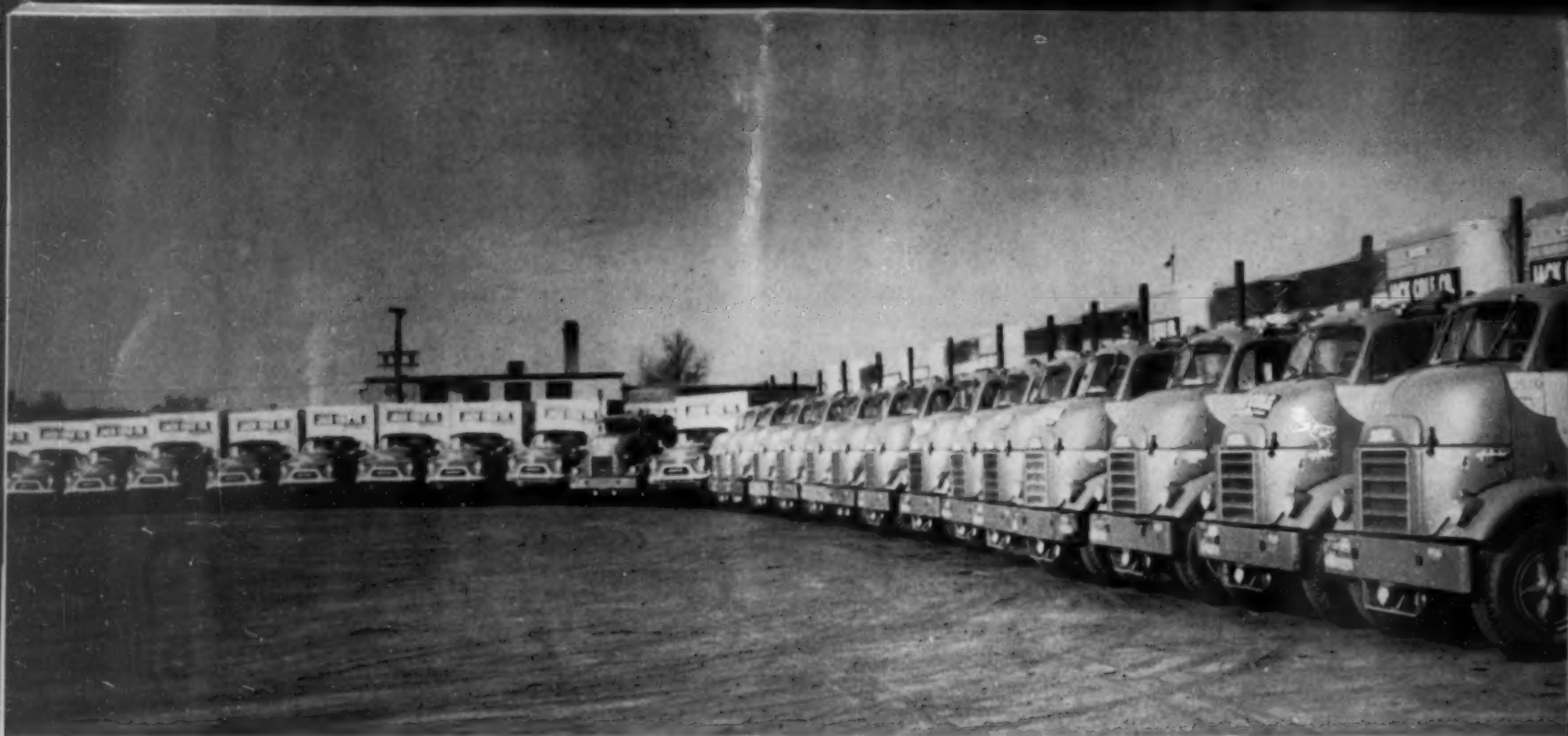
produced optimum performance at all speeds and loads. This design also permits the turbocharger to be easily located in a wide variety of positions and angles along the manifold, including rear mounting for installation where clearance is critical.

The new turbocharged diesels, like other engines in the 40-330 hp P&H line are built basically of aluminum. P&H pioneered in this field and has been producing aluminum engines for 15 years. Crankcase, oil pan, flywheel housing, cover plates, piping, manifolds, bearings, and the push rods are made of light-weight aluminum alloy. This extensive use of aluminum in P&H engines is feasible because of the unique unitized power assembly. In this assembly, the cylinder liners are attached to individual heads. Water jackets are fabricated to the liners. As a result, the entire power assembly can be withdrawn from the engine for overhaul in minutes, drastically reducing down time.

	387C-18T	487C-18T	687C-18T
Dry Weight	1290	1500	1950
Lbs./bhp	7.81	6.81	5.90







## DIESELS "ROLL WITH COLE"

**T**HROUGH the southeast, up the seaboard and as far west as Chicago, the familiar phrase, "Roll with Cole," means timely and safe shipment of goods and materials. Behind this phrase is a company that knows full well the meaning of operating efficiency and its records are solid evidence that this understanding is translated into lower operating costs. This organization is the Jack Cole Co. of Birmingham, Ala. Founded in 1933 with Jack Cole behind the wheel of a 1½ ton truck, the company has become one of the more prominent motor freight carriers. Today it operates 177 highway tractors, the majority of which are powered by diesels, 370 trailers

and has well over 500 people in its employ.

To reliably serve its customers, the company operates terminals and sales offices in 20 cities as far south as Mobile and as far north as Maspeth, Long Island and Detroit. Direct Western Union teletype communication is maintained between all points and the dispatch system operates 24 hours a day. When loads are ready, drivers are called and are on the highway within six hours after trailers are closed out. All power units operate out of Birmingham and return loads are dispatched from New York, Chicago, Philadelphia, Cincinnati, Indianapolis and Columbus, Ohio as the units arrive.

Currently Cole is running 14,600,000 miles per year. The highway tractors average approximately 168,000 miles per year or 14,000 miles a month. As of November, 1958, 203 over-the-road drivers were employed.

Key OTR tractors in the Cole fleet are DF860 GMC, 43 of which have been added since 1955. These units are all powered with Detroit Diesel 189 hp 6-71 engines with Fuller 10 speed Road-Ranger transmissions. Rear axles are Eaton 1911 with a 4.11:1 ratio and nylon 10:00 x 20 tires are used on all equipment. The GMC tractors pull 35 ft. tandem axle trailers of 52-56,000 GCW and

Fleet Supervisor, O. B. Jones, waves off a unit that has just been serviced and inspected.







◀ Dramatic shot of more than 25 of Cole's GMC diesel tractors at the Birmingham terminal.

Jack Cole, president of the company that bears his name, started the freight service in 1933.



GMC PREVENTIVE MAINTENANCE WORK SHEET	
Diesel Engine Equipped Trucks	
<p>Recommended Mileage - 1000 to 1500 Miles</p> <p>Recommended Time Interval - 2 to 4 Weeks</p>	<p>Recommended Mileage - 15,000 to 20,000 Miles</p> <p>Recommended Time Interval - 2 to 4 Months</p>
<p>DATE: _____</p> <p>TRUCK NO. _____</p> <p>ENGINE NO. _____</p> <p>DRIVER'S NAME _____</p>	
<p>1. Check oil level</p> <p>2. Check water level</p> <p>3. Check battery charge</p> <p>4. Check belt tension</p> <p>5. Check air filter</p> <p>6. Check fuel filter</p> <p>7. Check engine oil</p> <p>8. Check engine water</p> <p>9. Check engine air</p> <p>10. Check engine fuel</p> <p>11. Check engine oil</p> <p>12. Check engine water</p> <p>13. Check engine air</p> <p>14. Check engine fuel</p> <p>15. Check engine oil</p> <p>16. Check engine water</p> <p>17. Check engine air</p> <p>18. Check engine fuel</p> <p>19. Check engine oil</p> <p>20. Check engine water</p> <p>21. Check engine air</p> <p>22. Check engine fuel</p> <p>23. Check engine oil</p> <p>24. Check engine water</p> <p>25. Check engine air</p> <p>26. Check engine fuel</p> <p>27. Check engine oil</p> <p>28. Check engine water</p> <p>29. Check engine air</p> <p>30. Check engine fuel</p> <p>31. Check engine oil</p> <p>32. Check engine water</p> <p>33. Check engine air</p> <p>34. Check engine fuel</p> <p>35. 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Cole's modern maintenance shop in Birmingham with a group of GMC tractors in for general inspection. Inset is PM sheet for 2000 mile and 20,000 mile service.

Crankcase of one of the GM6-71 diesels being filled. Air cleaners are oil bath type.

payloads average 27,000 lbs. with maximums up to 40,000 lbs.

The Cole Company adheres rigidly to the preventive maintenance program as established for their equipment by GMC. The PM form illustrated is made up after each trip of approximately 2000 miles, along with the road drivers' complaint form. If this mileage suggests A or B preventive maintenance check, this is done in addition to the complaint and the inspectors suggestions. After all maintenance work is performed, the unit is then washed, fueled, lubricated, oil checked or changed. Oil and filter elements are changed each 4000 miles. The unit is run on a final check by the equipment inspector and then given to the road dispatcher for departure. This program is paying sound dividends according to R. M. Hipp, Jr., general sales manager. Records show average accumulated miles/gal. of 6.0 and a total direct cost per mile of .06 on 300,000 mile average. Seventeen of the newer GM diesel powered tractors placed in service the last year are giving fuel mileages from 7.2 to 7.4 per gal. Currently the company is beginning major overhaul at the 300,000 mile mark and are doing so at an average cost of \$300.00 per engine again including labor and material.

The Cole organization is typical of the way modern carriers are using diesels to upgrade their service while lowering operating costs. A statement by O. B. Johns, Jr., fleet supervisor, is indicative of this, "The simplicity of design and ease of maintenance of diesels has to date eliminated road failures. Engine overhaul is substantially less than gasoline models as less parts need replacement and work is performed in shorter time. Our diesels consistently operate 18 hours out of every 24."

Officers of the company in addition to President Cole are Sam N. Cole, vice president and general manager; J. A. Dumes, Jr., treasurer; C. B. Crawford, vice president of traffic and J. B. Cole, III, assistant to the vice president.



◀ The M. J. Crose drilling machine powered by an International U281 diesel and Fuller 5-A-33 transmission was ably assisted by an Allis-Chalmers tractor with side boom.

Young-Owens pipe wrapping machine. Along the parkway, the clearing and grubbing was a simple matter as the pipeline ran down the eastern side of the roadway bordering the various borrow canals. This was done with Allis-Chalmers HD 11 and HD 16 dieselized dozers and crawler tractors.

Pipe unloading was accomplished with a combination of a Link-Belt crane and an HD 11 Allis-Chalmers tractor with a side boom. After the pipe stringing gang had finished laying down the joints of pipe, the pipe benders moved in to bend the pipe into the angles prescribed by the engineers. The machines and pipe may whine and squeal but they always bend to the desired degree. A Crutcher-Rolls-Cummings bending machine, ably assisted by an Allis-Chalmers HD 11 crawler trac-



## TEXAS-FLORIDA PIPE LINE

By ED DENNIS

**T**HE coming of natural gas to Florida will have a terrific impact on the industrialization of this state as access to a reasonable, abundant and reliable supply of fuel is necessary for its growth. The Florida Development Commission believes a greater number of diversified industries will move to Florida in the near future because of the line. The Coastal Transmission Corp. and the Houston Texas Gas & Oil Corp. have banded together to build this natural gas pipe line from a spot near the Texas-Mexico border to Cutler, just south of Miami. The 2600 mile pipe line will be up to 24 in. in diameter and will have a rated capacity of about 280,000 mcf a day. The Houston Corp. takes over the Florida end.

The Florida Turnpike Authority, being wise in financial matters, completed an agreement with the pipeline authorities for a 35 ft. right of way along the eastern side of the 108 mile long turnpike for \$270,000. Obtaining this 108 mile right of way from one owner solved many a headache for the pipeline people. Usually, on a stretch of

"way" this size, there would have been several dozen or perhaps hundreds, of property approvals needed before the pipeline construction could start. The project is expected to be completed this year as the several crews of men rush completion of the 18 in. pipeline down the Sunshine State Parkway and the delivery of natural gas to South Florida is expected to begin shortly thereafter.

The Harbert Corp. of Birmingham has the contract for the placement of approximately 1000 miles of pipe. A construction job of this type calls for a large variety of dieselized equipment which includes a fleet of at least a dozen Allis-Chalmers dozers, sideboom tractors and motor graders, several Insley and Link-Belt Speeder machines powered with General Motors diesel engines. Among the welding machines are five Hercules dieselized Lincoln units and the two model 320 Cleveland ditch diggers are powered by Caterpillar diesel engines. Also working on the job, and powered with International engines are the Crutcher-Rolls-Cummings pipe bending machine and the Morris-

tor with a side boom, was being used in this phase of the operation. A model 320 Cleveland ditch digger, powered by a Caterpillar diesel was used to open the 6 ft. trench at the rate of about 100 ft. in 5 minutes. A General Motors dieselized Link-Belt clam bucket also assisted in this operation. At various borrow pits and drainage canals, Insley and Shield-Bantam dieselized machines were called into action. Where overpass structures, constructed





of high fill, were encountered, a Crose drilling machine was used. Next came the various teams of welders with relentless professionalism, they are probably the most expert in their trade in the world, and were using Lincoln welding machines, five of which were powered by models D. I. X. 4 D. Hercules diesel engines.

Close on the heels of the welders came the wrapping machine crew equipped with a Morris-Young-Owens wrapping machine. The rear end of the machine revolves completely around the pipe laying bands of wrapping material carried on two revolving spindles. The wrapping was placed in two layers with a thin wrapping of polyethylene tape, called Polyken, placed next to the pipe and enclosed with an outer wrap of fiberglass felt impregnated with asphalt. The Kendall Company of Chicago received the 3 million dollar contract to tape wrap the entire 1570 mile Florida pipeline system.

Wrapping operation is performed by an International powered Morris-Young-Owens machine. It is estimated 42 million square feet of tape will be required for the job.

A Link-Belt speeder 3/4 yd. clam bucket powered with a General Motors 3-71 diesel and G. M. power take off.



In spite of the terrain, which includes swamps, numerous rivers and borrow pits plus heavy timber lands, the Kendall engineers expect to complete the job of wrapping the pipe in June. Moving up, the lowering in gang, equipped with a team of Allis-Chalmers HD 11 and HD 16 crawler tractors equipped with side booms, gently place the pipe into the ditch, followed by the back filler crew assisted with Allis-Chalmers dozers. Then the clean up gang tidies up the right of way with the help of an Allis-Chalmers #45 motor grader. Few laymen actually realize that most pipelines in the U. S. are "common carriers" and are licensed by the Interstate Commerce Commission just like any railroad or trucking company. They are a one way thoroughfare that operates 24 hrs. a day, 365 days a year.

Crutcher-Rolfs-Cummings pipe bending machine on the job. Powered by an International diesel it can bend pipe up to 35 degrees if necessary. An Allis-Chalmers HD 11 diesel crawler tractor with a side boom assists in the operation.

A Cleveland #320 ditch digger at work. It is powered by a 4 cyl. Caterpillar diesel engine. Two of these machines were on the job.

Two of the five Lincoln welding machines equipped with Hercules diesels rated 57 hp at 3000 rpm.







## WHAT'S GOING ON IN ENGLAND

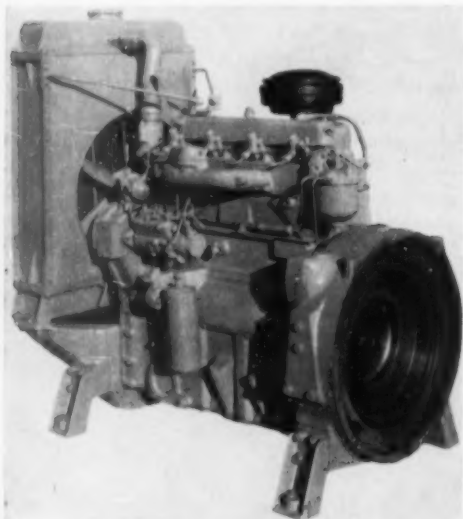
CONDUCTED BY BERNARD W. LANSDOWNE

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now manager-for-the-United Kingdom of a group of business and technical publications.

### Perkins' First Direct Injection Design\*

**A**LL of the very comprehensive range of diesel engines built by F. Perkins Ltd., of Peterborough, have to date been designed with an indirect system of fuel injection, and engines from this range are now used in a multitude of applications all over the world. Perkins has developed the indirect combustion system, moreover, to a point where some of their designs are approved for intermittent service at general operating speeds of up to 3,000 rpm.

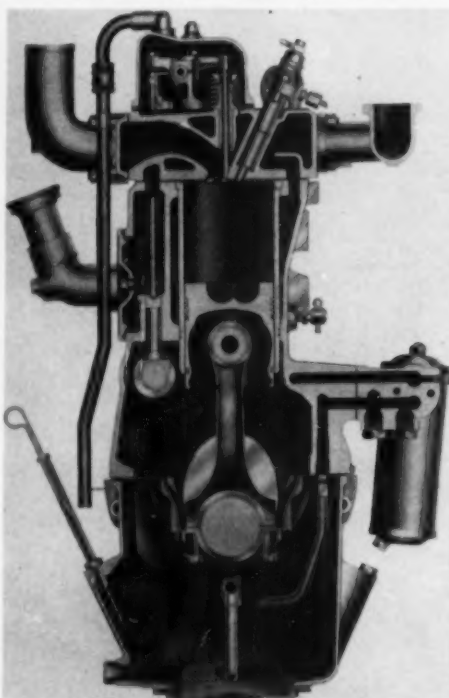
The announcement by Perkins of an engine with open type combustion, therefore, represents an important landmark in the company's history and its introduction follows an extended period of field trials and bench tests on prototype units. The new design is known as the type 270D and is available at present in four cylinder form. It is particularly suitable for farm tractors, combine harvesters, small marine and industrial applications. An ex-



Pedestal mounted 270D for industrial applications. Note CAV fuel pump.

tensive range of flywheels, flywheel and clutch housings and manifolds is available, providing great versatility in many applications. The industrial version can also be supplied in stage by stage form up to a complete power pack to suit

*\*In the April issue, DIESEL PROGRESS announced the 270D. Here author Lansdowne elaborates on the new design.*



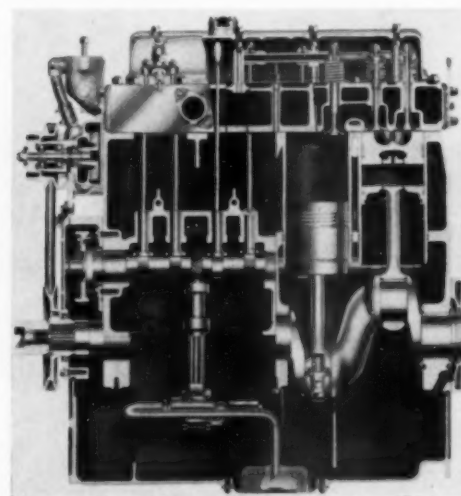
Transverse section of Four 270D diesel.

individual customers' requirements. In marine form it can be fitted with a mechanically operated reverse gearbox to operate either as a direct drive or with 2:1 or 3:1 reduction gears. Additionally, oil operated or self change gear boxes may be fitted and keel pipe, heat exchanger or direct cooling is available. The new engine has a bore of  $4\frac{1}{4}$  in. and a stroke of  $4\frac{3}{4}$  in., giving a cubic capacity of 269.5 cu. ins. The maximum permissible rating is 62 bhp at 2,000 rpm and, for tractor purposes, the engine weight is 680 lbs.

The outstanding feature of the design, of course, is the combustion system, the combustion chambers being formed in the piston crowns in the shape of toroidal bowls slightly off-set from the centre line of the pistons. Injection is through four-hole injectors and maximum air utilization and swirl in the cylinders is controlled by the inlet passages in the cylinder head without valve or port masking. The cylinder block is cast integrally with the crankcase and carries centrifugal-

ly cast iron wet liners. The cylinders are closed by a single piece cylinder head of high duty cast iron secured on the cylinder block by studs and nuts, the joint being made by a copper-steel-asbestos gasket. The rocker gear assembly is mounted upon the cylinder head, and is enclosed by a cast aluminum cover. One inlet and exhaust valve per cylinder are provided. The cast iron camshaft with chill-hardened cams, is mounted in a low position on the offside of the cylinder block. The front and centre bearings are pressure lubricated, the rear bearing is splash-lubricated, as are the cams.

The crankshaft is forged from heat-treated chrome-molybdenum steel with the main and big end journals induction hardened. The main journal and pin fillet radii are cold-rolled to improve fatigue strength. The rear end of the shaft is machined to provide thrust location, oil thrower and oil return scroll. Crankshaft end float and thrust is taken up by 360° steel backed lead bronze



Schematic cross section.

thrust washers, fitted in the cylinder block and rear main bearing cap. A cast iron crankshaft pulley is driven from the front end of the crankshaft by serrations, and is retained in position by a hardened timing dog which is locked by a tab-washer. With the use of a suitable crankshaft pulley, torque up to 150 lb. ft. maximum may be transmitted from the front end of the crankshaft. Three main bearings of the thin-wall pre-finished

steel backed, copper-lead lined type carry the crankshaft. Each half bearing is located by a tab which fits into a slot machined into the crankcase and bearing cap. The bearing caps are of high duty cast iron. The camshaft and fuel pump are driven from the front end of the crankshaft.

High silicon aluminum alloy is used for the pistons which have a toroidal cavity in their crown. Each piston is fitted with three compression rings and one scraper ring above the gudgeon pin, and one scraper ring below. The "H" section connecting rods are in high tensile steel and have their big-ends split at right angles to the axis of the rod.

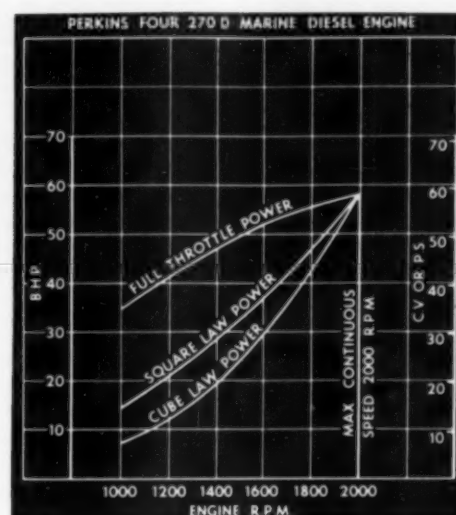
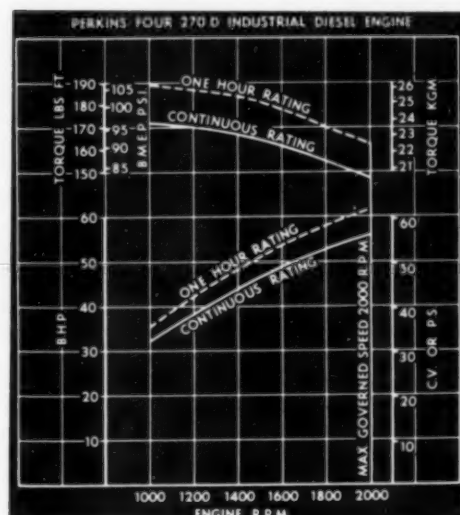
Lubricating oil under pressure is delivered by a pump through a full flow filter to a main gallery drilled lengthwise through the crankcase. Drilled

holes through the main bearing housings carry the oil from the gallery to the main bearings. It then passes via drilled holes in the crankshaft to the big end bearings. A supply of oil is taken to the centre camshaft bearing, where it is metered to feed the rockers and valve gear. A further supply of oil is taken to the idler gear boss for lubrication of the idler gear hub bearing. The idler gear hub meters the oil for general timing gear splash feed lubrication. The cylinder bores, small end bushes and gudgeon pins are lubricated by splash from the big end bearing. A water cooled lubricating oil cooler can be fitted if required and a tapping is provided in the lubricating oil filter adapter for the fitting of an oil pressure warning switch or a pressure gauge connection.

The CAV distributor type fuel pump is flange-



Canadian Cockshutt model 560. Tractor is powered by the new 270D engine.



mounted to a cast adapter, bolted to the timing case. A mechanical governor is incorporated in the fuel pump body, the speed control and cut-out levers being mounted on the side of the pump body. The diaphragm type fuel lift pump is equipped for hand priming and is operated by a push rod from an eccentric on the fuel pump gear carrier hub. The pump is mounted on top of the timing case, above the fuel pump drive gear.

Engine auxiliaries include decompression mechanism, 12-volt electric generator and a 12-volt "Thermostart" cold start heater. Provision is made for an hour meter or tachometer to be driven from the front of the fuel pump gear. Provision is also made on the timing case for a power take-off from the camshaft gear. An opening, normally covered by a blanking cover, is provided on the timing case, to which an auxiliary drive housing can be bolted. The torque which can be taken off the camshaft gear is limited to 35 lb. ft. continuous increasing to 40 lb. ft. intermittently.

## REA DIESEL PLANT MANAGERS MEET

**DIESEL PROGRESS Presents Plant Efficiency Awards at Albuquerque, N. M. Meeting**

Front row left:

R. B. Moore, Lovington, N.M., R.E.A.; Melvin C. Hill, Mich. 46; James O. Wood, Mich. 46; Orville Hurford, Mich. 37; D. L. Roggow, Hersey, Mich.; Clark Griffin, Florida 24; William Reed, R.E.A. Head Diesel Div.; Robert Staton, Minn. 47; Gordon Clark, Kirkwood Assoc., Con. Eng.; Chas. Ruba, Mich. 42.

Second row left:

Clyde Price, Lovington, N.M.; Murlen Cole, Kansas 34; H. P. Wingo, Okla. 32; Don H. Decker, Mich. 37; Carter J. Ponder, Mo. 60; F. O. Alberg, Minn. 10; Chas. A. Hill, Minn. 10; Kenneth Ault, Kans. 34.

Back row left:

Rex Wadman, DIESEL PROGRESS; Robert L. Stanley, Diesel Eng. Mfg. Assoc., George C. Elzea, N.E. Mo. Power R.E.A.; Bert Haggerton, N. Mex. 23; Phillip Paul, Scott City, Kan. R.E.A.; E. R. Felfe, N. Mex. 23; C. P. Turner, Pioneer Coop. Kan.; H. W. Eaves, Ill. 18G; E. E. Caine, Ariz. Graham 17.







# DIESEL SERVICE PROGRESS

A COMMENTARY BY GEORGE R. MACKEY

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

## Service Is Big Business

**S**ERVICE is a profitable business from the viewpoint of service profits and its total effect upon the overall sales activities of an organization. Unfortunately, there are still too many engine and equipment distributors and dealers who consider service as a "necessary evil." These organizations are very likely operating at a loss as far as the Service Department is concerned and, even though they may not be aware of it, they may have firmly established a reputation for poor service. Management's attitude in these poorly operated establishments will generally be negative to ideas, suggestions, and programs activated by the manufacturers they represent. More likely than not, they also require more factory supervision and factory assistance to get them out of trouble than any efficiently operated business. The poorly managed shop often lacks proper tools and equipment, has low morale, and a "don't give a damn attitude" among its employees. The General Manager of one such equipment distributorship recently stated, "It's getting so that hardly a week goes by without someone from the factory being here for some reason or other." He also stated, "If those men in the shop could only do something right for once, we might take a different attitude towards service." A visit to the shop showed why the mechanics of this establishment could not do a good job. There was no organization of work areas, inadequate working space, very few benches and tools, and a floor with many months' accumulation of dirt and grease. Mechanics were rebuilding engines and sub-assemblies on this dirty floor, with repair parts for the job sitting in the dirt and grime. No effort was made to assure that parts were clean before being installed, or that dirt was kept out of the engine during overhaul.

Many of today's large engine and equipment businesses started as small three or four man operations 20 or 30 years ago. At the start, some of these began each month with a known amount of money in the cash box. If at the end of the month there was more money in the box than at the beginning, it was considered a profitable period. Possibly the proceeds from new equipment sales, parts and service were all dumped in together with no record to show what each department con-

tributed to total operation. Quite often the owner of such a business devoted his efforts to new sales, never visiting the "back room" Service Department. This represented dirt, grease, headaches, and costs. It was the one part of the business he wished he could get along without.

Most of the well-organized modern business establishments have advanced with the times. They have hired proper caliber personnel to help operate the business and have adopted methods of control to show the true value of each department, including the Service Department. Many have incorporated plans and programs developed by their manufacturers. They recognize that service is the backbone of their business. Engine and equipment manufacturers' programs, set up for distributor/dealer use, are designed to influence customers on the complete service available, and the facilities used to assure high quality work. Shop layout, tools and equipment, management and mechanics training, and supplementary product training programs are generally included. One major manufacturer adopted a color scheme for all distributors' Service Departments, and standard uniforms for all mechanics. Monthly operating sheets, used by many manufacturers' groups provide methods for recording total sales, operating costs and profits for each department. The universal acceptance of programs developed by manufacturers for distributors/dealers' use result in a universal high quality service, profitable sales, approaches, standardization of procedures, improved operating efficiency, and greater customer satisfaction.

Some of the nation's leading fleet operations have adopted programs and ideas developed by manufacturers to profitably upgrade the quality of service. One major fleet, after analyzing its operation, decided that the only possible way to obtain a greater total profit was to place more responsibilities on the Service Department. It was determined that while equipment, material and labor costs were more or less fixed, a more efficient Service Department was the only change that could obtain the desired results. The Service Manager of this operation enlisted the aid of equipment manufacturers to analyze the service operation to

determine what had to be done. After many conferences, plans were made to completely overhaul the service operation. Mechanics were enrolled in schools, modern tools and equipment were installed. Engine Dynamometer Test Facilities were included to run-in and test engines after overhaul, and Chassis Dynamometer testing was planned as a part of preventive maintenance, and for quality control inspection of performance type service. The total results were amazing and instantaneous. The attitude and pride of the service group soon spread throughout the entire organization. Fuel costs were reduced; previous high cost of field failures and analysis of operator complaints were almost completely eliminated; engine life was increased by more than 20 per cent; and operational schedules were maintained. This change from the old catch-as-catch-can service methods previously used to control service schedules became the chief interest of management. This resulted in planned conferences with service management before major decisions were made. Service was recognized as a part of the total operation that contributed much to the success of profits of the company. It was no longer looked upon as a "back room operation" or "necessary evil." Instead, it was considered on a level with the Production Department.

Service is a business, a big business and a profitable business. Without it, we are dead. A sales organization or fleet operation that does not have service behind it, may as well give up as the aggressive competitors who recognize the value of service will eventually get the business. An old saying in the engine and equipment industry is—while the first unit sale is made by the Sales Department, additional and future sales are made by the Service Department. One old timer in the engine industry states, "There are more engines sold from tool boxes than from sales portfolios." Many independent service shops are capitalizing on some business failing to offer first class service. They are making a limited profit and enjoying a good reputation, yet Service is all they have to offer. Sales alone will result in marginal profits. Service alone will result in limited profits. Service and Sales is big business that can expect maximum profits and an enviable reputation.

# DIESELS ON DEFENSE

**S**UCCESSFUL air defense of this country depends on speed. The speed with which we receive warning of an attack and the speed needed to be prepared for that attack—if and when it should ever come—is a problem which is constantly faced by the Air Defense Command of the United States Air Force. In order to help cope with the speeds of today's aircraft and to assure adequate defense, the Air Defense Command is operating several SAGE Direction Centers along the Atlantic Coast from Maine to North Carolina covering over 250,000 sq. miles and protecting 45 million people.

SAGE, or Semi-Automatic Ground Environment, is the nation's vast, new electronic air warning network. The "brains" of this new system are huge electronic computers. These pieces of machinery have the almost human-like ability to receive, to memorize, to calculate and to record vital flight information instantaneously in the form of an intelligible code. This code is flashed upon the face of an electronic tube similar to a television screen. By watching this screen, air defense commanders will be able to follow the air battle situation in their areas of responsibility and direct those weapons available to them to the point of the most immediate and certain destruction of enemy forces.

At the Syracuse Air Defense Sector outside of Syracuse, N.Y., seven Worthington diesel engines generating over 12,000 bhp drive seven 1250 kw Elec-

tric Machinery generators. These units furnish all of the prime power needed to operate the SAGE facilities—the most vital components being the two electronic computers. Operating on an around-the-clock basis, these computers require the same amount of electrical power that would provide for the needs of a community of 20,000 people! Captain F. Pitkin Smith, Installations Engineer, reported that the Worthington engines have each operated in excess of 10,000 hrs. and have required no major maintenance. Fuel consumption, he also stated, has been well within the guarantee.

Another vital component of this SAGE facility receiving power from the Worthington diesels are four 400-ton air conditioning units. These centrifugal refrigeration machines are used to maintain a constant temperature and humidity for the electronic equipment installed throughout the Direction Center. Each computer contains over 58,000 electronic tubes, generating enough heat to comfortably warm 45 homes at 20 degrees below zero. Each tube is individually air conditioned. The temperature of the SAGE building is extremely critical for the efficient operation of the electronic gear. The normal temperature of the building is maintained at approximately 72 degrees. If the air conditioning should fail the temperature would climb to 150 degrees within a matter of two minutes! In addition fifteen other Worthington diesel engines are in operation at SAGE air defense centers at Maguire Air Force Base, Stewart Air Force Base and Truax Air Force Base.

At the Syracuse Air Defense Sector seven Worthington diesel engines producing over 12,000 bhp drive seven 1250 kw generators that furnish all of the prime power to operate the Sage facilities.



Distribution of power is through the high voltage switch gear on the right. Low voltage switch gear on left receives power from motor generator room.

A maintenance control room monitors the operating status of all primary pieces of equipment in the powerhouse. This is done by referring to the schematic panel or by monitoring a panel of flashing neon lights.







# GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

## Exhibitors at the Fourth Gas Turbine Conference

**A**T the Gas Turbine Power Division's Conference in Cincinnati in March 1959 there were more gas turbines displayed than at any other previous exhibit. This was largely due to the fact that the development period had passed whereas at previous exhibits the turbines were still in their development stage. Following is a list of exhibitors together with the products which they exhibited.

### *Austenal, Inc., Division of Howe Sound Co.*

Austenal, Inc., displayed investment castings, manufactured by the "Microcast Process" in stainless steels, tool steels, carbon steels, high temperature alloys, as well as vacuum melt-vacuum cast alloys.

### *Boeing Airplane Co., Industrial Products Division*

Boeing exhibited recent applications of the 502-10C and 502-11B gas turbine engines and featured a cutaway version of the 502-10C and major components of Boeing gas turbine engines.

### *Brown Boveri Corp.*

Brown Boveri displayed a large new model of a blast furnace gas fired turbine driving a furnace blower. Usable power of the full-scale machine is 15,000 kw. Many turbines of this type have been installed in Europe. In addition illuminated reproductions of several types of gas turbines for power plant and industrial use were shown.

### *Clark Bros. Co.*

Clark displayed dual shaft, open cycle gas turbines for industrial, refining and processing applications. Exhibit highlighted adaptability of these machines as prime movers for centrifugal compressors, liquid pumps, generators, and process applications where both rotative power and steam are required. The line ranges in size from 1220 to 9300 bhp and operates on either liquid or gaseous fuel.

### *Cleveland Graphite Bronze—Division of Clevite Corp.*

Cleveland Graphite Bronze Div. of Clevite displayed mechanical seals for aircraft and industrial applications and also featured sleeve bearings for turbine and accessory uses. Clevite 300, a new high-

temperature non-lubricated material, is now available for test and evaluation. This material exhibits excellent antifriction properties, low wear rate and thermal stability at ambient temperatures up to 1200° F.

### *Fabricast Division GMC*

Display featured an enclosed layout of various stage turbine blades and vanes with their corresponding engines and aircraft applications. A process display and a four-minute sound-color film depict the production of typical blades and vanes. Production and development work with integral cast turbine wheels, impellers, and vane segments were also shown.

### *Formsprag Co.*

The Formsprag booth displayed over-running clutches as used in conjunction with gas turbine engines. Various applications and special designs were featured.

### *The Garrett Corp.*

The AiResearch Manufacturing Divisions provided a display of gas turbine compressors and power units designed for airborne and ground support applications on aircraft and missiles, both military and commercial; along with air turbine motors, starters, and generators. Also featured were turbochargers for diesel engines—all products of Garrett's AiResearch Manufacturing Division in Los Angeles, Phoenix and the AiResearch Industrial Division in Los Angeles.

### *General Electric Co.*

General Electric Jet Engine Department displayed their J-79 gas turbine for the first time at a show other than the military. This unit has variable stator compressor blades.

### *Koppers Co., Inc. Metal Products Division*

Koppers' display featured panels and samples of high speed coupling line as well as shaft seals and gas turbine silencing equipment.

### *Lear Inc.*

Display of instrument components and actuation

systems. Lear featured its remote engine-trimming system. The company also showed a high-temperature pneumatic power unit for thrust reverses and other 1000° F. actuation systems.

### *Lucas-Rotax Ltd.*

Lucas-Rotax exhibited its fuel system, combustion and electrical equipment. The display included main and reheat fuel pumps, nozzles and controls. A Rover engine combustion chamber, tubular heat exchanger and examples of stitch and seam welding of titanium jet pipe shrouds were also exhibited. Also shown was an environmental-free alternator and a high temperature rotary actuator.

### *Lycoming Division—Avco Mfg. Corp.*

Hardware on display included a T53 gas turbine engine, rated at 860 shp and a T55 gas turbine engine, rated in excess of 1850 shp. Also depicted were numerous actual and potential applications for these engines in the aircraft, industrial and marine fields.

### *Marman Products Co., Inc. Subsidiary of Aeroquip Corp. 11214 Exposition Boulevard, W. Los Angeles 64, California.*

Marman displayed full size drawings of turbine engine with actual nozzle assembly ring, manufactured by Marman, using its new turbine vanes manufactured by a new concept of vane engineering and fabrication.

### *McGregor Manufacturing Corp.*

McGregor's exhibits demonstrated its abilities in the field of precision fabrication, welding and machining of gas turbine components in high temperature alloys. Samples on display included turbine rotors, nozzle rings, scrolls and missile propellant pressure vessels. A small gas turbine powerplant fabricated for Vector Corp. by McGregor was on display.

### *Misco Precision Casting Co.*

Gas turbine parts cast by Misco's Mono-Shell process were displayed. The engine vanes and blades shown feature various alloys in use several years and in addition the newer vacuum melted

and vacuum cast alloys. Complete nozzle assemblies, valve bodies, after burner sections, mounts, flanges, and hardware were shown in addition to the vanes and blades. Various stages of the Mono-Shell process and its application to air cast, inert gas, and vacuum casting were explained. Alloy data is available for high temperature, high tensile, and corrosion resistant requirements.

#### *Wm. W. Nugent & Co., Inc.*

Nugent exhibit consisted of lubricating devices, oil filters and strainers. One item of the exhibit included an oil filter for a capacity of over 400 gpm of lubricating oil filtering particle size as 2 microns from the oil. Duplex fuel oil filters were also exhibited.

#### *Solar Aircraft Co.*

Models of the new Solar Saturn 1100 hp and Titan 55 hp gas turbine engines were shown. Illustrations show the variety of uses to which Solar turbines have been out including speedy new offshore crew boats. In addition various turbine components were shown.

#### *Westinghouse Electric Corp.*

Westinghouse exhibited a pictorial display of its gas turbine installations as they are applied to natural gas transmission, oil field repressurization, electrical power generation, chemical and petrochemical applications. Several gas turbine models were also shown.

#### *Woodward Governor Co.*

Manufacturers of Controls for Prime Movers. The exhibit consisted of several cutaway models of speed governors and fuel controls, for small gas turbines as used on ground power units and aircraft auxiliary equipment, and larger fuel control units for use on large gas turbines for aircraft propulsion.

#### **Shrimp Trawler *Nina E***

The *Nina E*, a 57 ft. shrimp trawler was constructed by Diesel Engine Sales of St. Augustine, Florida for Sam Vona and Sam Vona, Jr. of Jacksonville, Fla. Measuring 57 ft. in length with a beam of 17 ft. and a draft of 7 ft., the *Nina E* is



powered with a General Motors 6071-E diesel engine having a horse power rating of 170. The engine was supplied by the Florida Br. Detroit Diesel Engine Div. General Motors Corp. It came equipped with G. M. 4.5:1 hydraulic r&r gears which turn a 50x34 four blade Federal propeller. The engine is cooled through a Walter Clean-Flo keel cooler. Sam Vona is well remembered as the discoverer of the Campeche shrimp beds while fishing on the Vona Mabry . . . see Diesel Progress May 1952, Pink Gold.

#### **Diesel Trucks for Crushing Plant**

To service a new crushing plant which it expects will help increase business measurably, North Wilbraham Sand and Gravel Co. has placed in operation five International model RDF-230-H trucks with 10 yd. capacity dump bodies. Alfred Dauphinais, Sr., president (second from right), and Al Dauphinais, Jr., treasurer (second from left), accept them at time of delivery from E. B. Knudsen, International branch manager at Springfield (left) and salesman J. J. Baribault. Purchase of the units represents a fleet expansion for the seven-year-old company which last year grossed \$1 million. Equipped with Cummins NH-180 diesel engines and four-speed auxiliary transmissions, the RDF-230-H trucks are used to haul aggregate be-



tween a quarry and the new crushing plant. Five more of the same models have been ordered for mid-1959 delivery. Construction Service, Inc., which has 16 ready-mix cement plants in the state, is also operated by Al Dauphinais, Jr., and uses a number of International model RF-230's.

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Both the four 2125 H.P. main propulsion engines and the three 125 KW generator engines are kept at a constant temperature of 252°F. by the Vapor Phase System. Waste engine heat in the form of a mixture of steam and water passes to a Vapor Phase Separator where steam is extracted and water is returned to the engines at the same temperature as the mixture which left them. The high, even heat circulating around the engines prevents formation of sulphuric acid on the cylinder walls and sharply reduces wear on working engine parts. As a result, maintenance costs are substantially lowered.

## PERMITS USE OF LOW-COST BUNKER C FUEL

Heavy fuel is carried in eight steam coil-lined bunkers where it is heated to 80-90°F. by steam supplied from the Vapor Phase Separator. By pre-heating the fuel and providing high, even engine heat, the Vapor Phase System makes it possible for the main propulsion engines to idle and run at all speeds on inexpensive Bunker C Fuel.

## PRODUCES STEAM FOR EVAPORATIVE STILLS

The steam produced by the Vapor Phase System is further utilized to operate the Vapor Phase still which supplies 2400 gallons of potable water per day—enough to take care of all of the big Towboat's fresh water requirements.

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Subsidiary of St. Louis Shipbuilding & Steel Co.

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## Nordberg Names Dietle General Sales Manager



Carroll E. Dietle

In a move to expand activities in all markets for diesel engines, appointment of Carroll E. Dietle as General Sales Manager of the Engine Division was announced recently by R. W. Bayerlein, vice president, engine division, Nordberg Manufacturing Co. In his newly created post Dietle will be responsible for the coordination of all diesel engine sales, including Nordberg's two and four cycle engines. His duties will further include the introduction to the trade of additional sizes and types of diesel engines to be manufactured at Nordberg's Milwaukee and St. Louis facilities. He will headquarter in the company's main offices in Milwaukee. Prior to joining Nordberg, Dietle was manager of the diesel division of Fairbanks Morse & Co. where he had served some 27 years in various capacities. He had previously served as engineer for Consumer Power Company in Jackson, Mich. and as a resident engineer for Stevens & Wood, a utilities construction engineering company. A graduate of the University of Michigan, Dietle earned his Bachelor of Science degree in engineering in 1931. Mr. Dietle is actively engaged in various sales and engineering societies, and is a registered professional engineer in the states of Illinois, Michigan, Kansas, Ohio and Nebraska.

## Bego and Franck Promoted at Cummins

Promotion of G. L. Bego and R. W. Franck to new positions with Cummins Engine Co., Inc. has been announced by C. R. Boll, vice president—sales. Mr. Bego, a native of Indianapolis, has been named Director of Sales Services and is responsible for directing all activities of the sales development department and Cummins Diesel Sales Corp. Previously, he was Manager of Cummins Diesel Sales Corp., a wholly owned subsidiary of the Company. Mr. Bego joined Cummins in 1951 after obtaining a Bachelor of Science degree in mechanical engineering from Purdue University. Mr. Franck has been appointed Cummins' new Field Sales Manager and is responsible for fleet sales activities and Cummins' regional offices. He joined the Company in 1948 and was Manager—Sales Development prior to his new appointment. His home town is Rockwell City, Iowa, and he is a graduate of Drake University and Harvard Business School. Both Bego and Franck report to Boll.

**DIESEL PROGRESS**



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TWIN DISC  
FRICTION and  
FLUID DRIVES

BULLETIN No. 314

-  Small Mechanical Clutches
-  Medium & Large Mechanical Clutches
-  Wet-Type Clutches
-  Air-Actuated Clutches
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-  Fluid Couplings
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-  Three-Stage Torque Converters
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operation, the release spring cavity with oil to equalize the centrifugal force on each side of the piston. For normal motor, hydraulic balance is not required.

D	E	F	G	H
1.00	2.00	3.00	4.00	5.00
1.10	2.20	3.30	4.40	5.50
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1.30	2.60	3.90	5.20	6.50
1.40	2.80	4.20	5.60	7.00
1.50	3.00	4.50	6.00	7.50
1.60	3.20	4.80	6.40	8.00
1.70	3.40	5.10	6.80	8.50
1.80	3.60	5.40	7.20	9.00
1.90	3.80	5.70	7.60	9.50

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construction. And the Twin Disc line is *complete*. It includes mechanical, air, oil and electrically actuated friction clutches, fluid couplings, friction and fluid PTO's, single-stage and three-stage torque converters and marine gears. The fact that Twin Disc makes so many different types of drives is worth remembering. It means that Twin Disc engineers can offer *completely unbiased recommendations* whenever there's a question of drive selection.

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## New Types of Diesel Vehicles from Sweden

Sweden's two commercial vehicle manufacturers, Scania-Vabis and Volvo, have just released data about new developments in the field of diesel-driven units. Scania-Vabis has taken up the production of a new type of bus, known as CF 75, while Volvo has presented new ver-

sions of its L 385 and L 395 trucks. Scania-Vabis' CF 75 is of integrated construction, with body and frame forming one unit. It has been designed on the basis of the experiences gained in the company's manufacture of Metropol and Capitol buses. The bus is powered by a 6 cylinder Scania-Vabis direct-injection diesel engine of 165 hp at 2,200 rpm. The four-speed gearbox is wholly syn-

chronized and the equipment includes power steering and compressed-air brakes. The bus accommodates 75 passengers, including 46 seated. The new versions of Volvo's trucks, designated L 485 and L 495, feature improved loading factor, i.e. better relationship between payload and the unladen weight. Both trucks are equipped with direct-injection diesels, the former of 115 bhp

at 2,400 rpm and the latter of 150 bhp at 2,200 rpm. As extra equipment the large engine is available with a turbo-compressor supercharger which increases the output to 185 bhp. Other features include more powerful brakes, an improved silencer system, and a towing hook recessed into the front bumper.

ITS NEW

## Bulletin on High Speed Drives

Engineers involved with the application of high speed gear drives will be interested in Bulletin 5904 just released by Western Gear Corporation. This bulletin covers a complete range of high speed drives for special test stands, industrial applications, pipeline and air conditioning service. It contains complete engineering details, dimensions, rating tables and other installation aids. Many special units are shown to 50,000 rpm and 50,000 hp. Typical installations in all types of service are illustrated. For a copy write Industrial Products Division, Western Gear Corp., P.O. Box 126, Belmont, Calif.

ITS NEW

## Composite Product Bulletin by American Air Filter

A new 16-page composite product bulletin which contains a description of American Air Filter Company's complete line of products, has just been released. Bulletin No. 518 illustrates and describes its products for air filtering, cooling, heating, cleaning (controlling process dust), moving, exhausting, humidifying and dehumidifying air for the benefit of men, machines and profits. Included are descriptions of products manufactured by the Kennard, Herman Nelson, Illinois Engineering and American Air Divisions of AAF.

Kennard products described include air conditioning units, air conditioning coils, packaged liquid chillers, cooling towers, evaporative condensers, heating, ventilating and air conditioning units, steam and water coils, and other component parts, including the Roll-O-Vent automatic renewable media air filter. Herman Nelson products include unit heaters, centrifugal and propeller fans, unit blowers, industrial exhausters, and commercial portable space heaters. American Air Division's products described are electrostatic precipitator air filters, dry-type air filters, viscous impingement air filters, dry centrifugal dust collectors, wet-type dust collectors, fabric arresters, electrostatic precipitators for oil, fume and dust collection and engine and compressor intake air filters. Bulletin No. 518 is available upon request from Dept. PD, American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.

ITS NEW

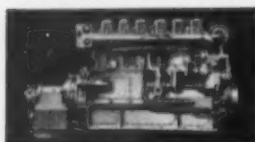
# WAUKESHA Diesel

## MARINE ENGINES up to 990 hp

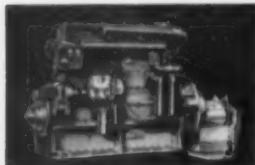
- Easy Starting
- Safety • Simplicity
- Smoothness • Economy



Reliance (VLRD Series) 990 hp



Defender (LRD Series) 510 hp



Wanderer (NKD Series) 315 hp



Resolute (WAKD Series) 290 hp



Vigilant (148-D Series) 195 hp



Cutwater (135-D Series) 120 hp



**CAPTAIN DEEBOLD**—65-ft. dragger. Powered by Waukesha "RESOLUTE." Installation by Hathaway Machinery Co., Inc., Fairhaven, Mass.



**VIEKODA**—72-ft. twin screw tender. Powered by two Waukesha "VIGILANT." Installation by Piston Service, Inc., Seattle, Wash.



**BENSON H. RIGGIN**—91-ft. Menhaden seiner. Powered by Waukesha "DEFENDER." Installation by Quinn Fisheries, Port Arthur, Texas.



**NORTH SEA**—72-ft. dragger. Powered by Waukesha "DEFENDER." Installation by Hathaway Machinery Co., Inc., Fairhaven, Mass.

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Engine Model	Engine Type	No. Cyls.	Bore and Stroke	Displ. Cu. In.	MAXIMUM RATING 24-Hour Duty
RELIANCE	Normal	12	8½ x 8½	5788	665 horsepower @ 1215 rpm
	Turbo	12	8½ x 8½	5788	990 horsepower @ 1215 rpm
DEFENDER	Normal	6	8½ x 8½	2894	335 horsepower @ 1215 rpm
	Turbo	6	8½ x 8½	2894	510 horsepower @ 1215 rpm
WANDERER	Normal	6	7 x 8¼	1905	240 horsepower @ 1215 rpm
	Turbo	6	7 x 8¼	1905	315 horsepower @ 1215 rpm
RESOLUTE	Normal	6	6¼ x 6½	1197	195 horsepower @ 1600 rpm
	Turbo	6	6¼ x 6½	1197	290 horsepower @ 1600 rpm
VIGILANT	Normal	6	5¼ x 6	779	150 horsepower @ 1800 rpm
	Turbo	6	5¼ x 6	779	195 horsepower @ 1800 rpm
CUTWATER	Normal	6	4¼ x 5	426	100 horsepower @ 2000 rpm
	Turbo	6	4¼ x 5	426	120 horsepower @ 2000 rpm

## Inland River Reports

By A. D. Burroughs

**BADGER**, a new 150 x 33½ ft. towboat, is in service for Midwest Towing Co., Alton, Ill. Built by St. Louis Shipbuilding and Steel Co., this modern craft has 3200 hp delivered from two GM Cleveland engines, model 16-567C.

TWO Caterpillar engines provide 580 hp for the new towboat, *Dorothy*. Built by Maxon Construction Co., Tell City, Ind., for West Lake Quarry and Material Co., Robertson, Mo., the 58 x 20 ft. craft will enter limestone trade on the Missouri River.

**EUGENE** Luhr and Co., general contractors, Columbia, Ill., add a pair of new boats built by Humboldt Boat Service, St. Louis. One craft, measuring 35 x 10 ft., has 100 hp supplied by a GM Detroit engine, model 4-71.

**DELTA** Towing Company's newest fleet member, a 115 x 34 ft. towboat, is under construction at Greenville, Miss., by Elmer Vickers. The planned 1800 hp will come from three GM engines.

**EMMA COFFEY**, the new 40 x 10 ft. craft built by Barbour Metal Boat Works, St. Louis, is in active duty as a dredge tender for owners Tennessee Valley Sand and Gravel Co., Sheffield, Ala. Power is supplied by a 150 hp Cummins engine.

**WESTERN** Machinery and Engine Co., St. Louis, will supply five new engines for two new boats under construction at Humboldt Boat Service. The triple-screw craft will carry GM Detroit Model 6-71-E engines. The twin-screw craft will carry two GM 6-110's.

**NEWEST** towboat scheduled for duty with Arrow Transportation Co., on the Tennessee River is near completion at McAlester Bros., Greenville, Miss. Similar to the popular *Betty Sue*, the 83 x 26 ft. towboat will have 1200 hp from two Caterpillar engines.

**BADGER BOY**, a 50 x 19 ft. towboat, has been delivered by Humboldt Boat Service to Bernhardt Bros., Cassville, Wis. The 440 hp comes from GM Detroit 6-110's.

**NEW** twin-screw crewboat, *Wildfire*, built by Equitable Equipment Co., New Orleans, is turning in favorable performance for H.O.M.E. Boat Rental Service, Golden Meadow, La. The 54 x 15 ft. craft is equipped with GM Detroit turbocharged engines.

**MISSISSIPPI** Valley Barge Lines' towboat, the *Northern*, with 3200 hp de-

veloped from Fairbanks-Morse OP engines, will ply as the *M/V Peoria*. The new name cuts confusion with the Union fleet containing the boats, *Southern*, *Western*, and *Eastern*.

**RAMBLE** upriver resulted in sighting the *Linda Brooks*. This still-new towboat, built in Texas for Brooks Liquid Transport Inc., travels river, lake, and canal with equal ease with power supplied from two Superior engines from White Diesel Engine Division.

**GRAYMARINE** diesel engine, model 6-D427, will power the new U.S. Engineers launch, soon to appear from Grafton Boat Works, Ill. To Be named for its mother ship, the 26 ft. craft will serve in Gulf waters.

IN answer to inquiry, *Triple Power* is the craft plying inland waterways, a boat known to many as the *Marjelea* of Lea River Lines. It is equipped with three Enterprise engines with the re-vamping and repowering handled in 1957 at Sturgeon Bay, Wis.

**FAMILIAR** *Jim Martin* has shown up in river traffic as the *Ravenswood*. This Ashland Oil towboat, built in 1940 by Calumet, has power provided by Fairbanks-Morse engines.

**DRILL** barge for Brewster and Bartle Drilling Company is under construction at Avondale Marine Ways. Hull size will be 200 x 54 ft. for this fully-equipped craft. Diesel power will be supplied from three V-12 Waukesha engines.

**MERCHANT** *Prince*, a 1959 boat fresh from Dravo for Western Rivers Corp., Pittsburgh, has been purchased by Union Barge Lines. The beautiful performer measures 148 x 34 ft., and has adequate 3200 hp provided by two GM Cleveland engines.

### New Design Engineer Appointed

J. E. Lonergan Co., Philadelphia, has appointed Harold I. Gregg as a new design engineer. Announcement of Gregg's appointment was made by Ronald V. Smith, vice-president of the 87-year-old valve manufacturing firm. Before joining the Lonergan Co. Gregg worked as a product design engineer with Yarnall-Waring Co., where he designed new steam traps, strainers, and blow-off valves. Previous to this assignment he was a mechanical engineer in charge of power plants in the 4th Naval District. Gregg is a graduate of Drexel Institute of Technology, where he received his bachelor's degree in mechanical engineering. He also teaches evening college classes in applied mechanics and strength of materials.

## Minneapolis-Moline Announces New Diesel Tractor

Called the most powerful tractor ever built by Minneapolis-Moline, the firm's big new G-VI tractor was announced by Matt Carroll, vice president-marketing, as currently in production. The new G-VI, weighing approximately 7600 lbs., with a wheel base of 96 in., turns in a

radius of only 16 ft. 4 in., and has been engineered for good weight distribution and traction. The Minneapolis-Moline six cylinder engine in the G-VI develops 81 belt hp and 72 drawbar hp on LP gas, and 75 belt and 67 drawbar hp on diesel fuel. Field speeds range from 2 mph up to 7 mph. For travel, speeds range from 11.3 up to 17 mph.

ITS NEW



Three low-speed engine-type units installed in an Ohio Valley sewage treatment plant.

## ideal performance

Four outstanding reasons why IDEAL Generators are best suited to your specific generating requirements:

- **CUSTOM DESIGN** — each unit engineered to your specifications with ample capacity to withstand overloads for extended periods.
- **LONGER LIFE** — many units installed 30 to 40 years ago are still in operation and provide dependable, trouble-free service.
- **PROVEN ECONOMY** — power plants equipped with IDEAL Generators have won REA Economy Awards three years running. Hundreds of other units show substantial savings in operation and maintenance.
- **SERVICE** — 147 IDEAL sales and service offices, strategically located across the nation, stand ready to serve you.

### UNIFIED RESPONSIBILITY

Low and high-speed types in ratings from 10 to 10,000 KW, with switchgear and controls for all applications. Extra emphasis on rugged construction, with a wide selection of insulations and a patented bearing design for simple, easy replacement.



**EMERGENCY STANDBY**—Typical high-speed unit installed on a diesel generating set in a Midwestern metropolitan telephone exchange.

Write for Bulletins 505 and 510



**The IDEAL ELECTRIC**  
& MANUFACTURING COMPANY  
300 East First Street  
Mansfield, Ohio

SINCE 1903, AMERICA'S FINEST MOTORS, GENERATORS, MOTOR-GENERATOR SETS, SWITCHGEAR AND CONTROLS



## Florida Diesel News

By Ed Dennis

THE *Inagua Cay*, an island tanker, measuring about 120 feet in length, was launched on April 29th at Dade Drydock Co., Miami. It is powered by a pair of D342 Caterpillar diesel engines. Two D311 Caterpillar 25 kva diesel gen-

erating sets are also in the engine room. West India Shipping Co., Inc. is the proud owner of this new Inagua vessel.

TWO General Motors 6-110 diesel generating sets with 100 kw Delco generators plus a 3-71 General Motors 30 kw Delco generating set are to be installed as auxiliary sets at station No. 7 of the Central and Southern Florida Flood

Control Commission. The station is currently being constructed about 25 miles south of Lake Okeechobee on route No. 27.

THE *Dutch Eagle* a 72 ft. yacht built in Holland and sailed by her owner to his home in Fort Lauderdale, Florida, is powered by a pair of D326F Caterpillar marine diesel engines with an output of 134 hp at 1600 rpm. It is also equipped with pneumatically operated Twin Disc 1.96:1 r&r gears.

L. C. Ringhaver, president of Diesel Engine Sales, Inc., St. Augustine, announced the purchase of the General Marine Boatyard, Inc. of Fort Myers Beach through its subsidiary the Diesel Corporation. The yard will continue to build dieselized shrimp trawlers and will be in the charge of Ken Pacetti who is general manager and vice president of the Diesel Corp.

FLORIDA Georgia Tractor Co. supplied the model HOD two and a half cubic yard Hough Payloader powered with a Cummins JN6BI diesel and Allison 3.5:1 torque converter, to the Alachua County Commissioners.

LEE Motors of Fort Myers, Inc., Fort Myers, are the State's distributors for the industrial line of Ford diesel engines. Metzger Industries of Miami are the sub-dealer for South Florida for both the industrial and marine diesel engines.

SHELLEY Tractor & Equipment Co. of Miami are supplying the three D342C turbocharged Caterpillar diesel engines to the Florida Keys Aqueduct Commission for the new water pumping stations on Stock Island and Key West, each are rated 220 cont. bhp at 1200 rpm.

THE Iron Metal Co. of Orlando repowered their GMC A723 highway tractor from gasoline to a JBS Cummins diesel using the same transmission. The new engine is rated 160 hp at 2500 rpm. And Walter Mc Landon took delivery of a NH180 in an International RD-255H highway tractor.

THE White Diesel Engine Div. will supply the model 40SX8 turbocharged diesel engine for the Marco Island Gulf Test Range station, it is rated 712 hp at 900 rpm, 131 bmep. The 480 volt General Electric generator is rated 500 kw.

MODEL HU Payloader tractor shovels, powered by 84 hp Hercules diesel engines, were delivered to the A. J. Parker Construction Co., Sample Rock Co. and the Marion Construction Co. for use in the road construction field.

TWO Allis-Chalmers HD16 crawler tractors with dozer blades are currently

being used by the Harbert Construction Co. and another HD16 is being used by the Marion Construction Co. on road work. These are powered with model HD844 Allis-Chalmers, 4 cycle diesel engines, max hp 163.

THE Orlando Livestock Ranch, outside of Holopaw, was used as a proving ground for the new model D8 Caterpillar series H tractor before it was put on the market. This new Cat powered tractor develops 225 hp and is more than two tons heavier than the old D8 model.

CAPELETTI Bros., Inc. recently acquired a TD24 crawler tractor powered by a 161 hp International diesel plus a TD4 crawler tractor and a model UM-32C Springfield-Buffalo powered with a 4 cyl UD350 International diesel engine.

A Mercedes-Benz, model OM326 diesel engine, rated 175 hp, with 2.5:1 Capital hydraulic r&r gears, was installed in a new 50 foot pleasure craft constructed by the Spencer Boat Works at West Palm Beach. A 10 kw 21 hp Mercedes-Benz diesel generating set was also included.

SQUARE Deal Machinery Co. of Orlando are the new Euclid construction machinery distributors for the State of Florida. Branch offices for Sales & Service are being maintained at Jacksonville and Miami. They recently sponsored the Big 3 Power Parade, the first of some 50 demonstrations, of Euclid dieselized construction machinery, which will eventually cover the nation during the coming months.

DIESEL Engine Sales, Inc., St. Augustine, installed a General Motors 6-71 diesel with a G. M. power take-off in their recently acquired saw mill. They also had a G. M. 4-71 diesel with G. M. 4.5:1 hydraulic r&r gears and G. M. power take-off, installed in their 20 ft. general utility steel yard vessel, before taking delivery of it.

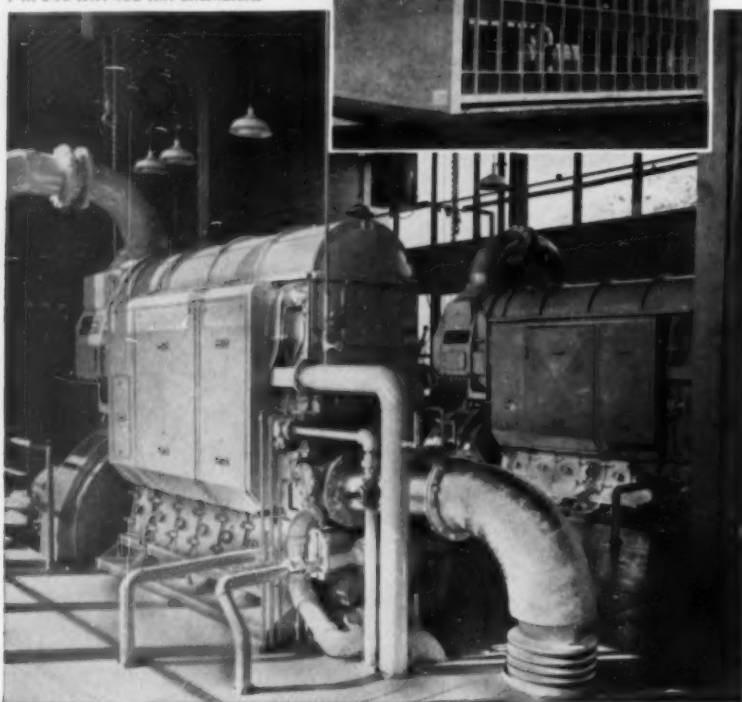
AT Orlando, the Hubbard Construction Co. took delivery of a P&H soil stabilizer powered with a P&H diesel engine model 6-87-C18. This two cycle engine is rated 205 hp at 1800 rpm.

ELLIS Diesel Sales & Service of Fort Lauderdale repowered the yacht *Leonie* of Houston, Texas, with a pair of General Motors 6-71 diesel engines each rated 170 hp. Also included were General Motors 2:1 hydraulic r&r gears.

THE City of Kissimmee awarded a \$510-216 contract to Fairbanks-Morse for the purchase of a 3000 kw diesel generating set. This new addition will boost the plant's capacity from 4920 kw to 7920

Modern power plant, with two F-M O-P diesels, insures uninterrupted power supply.

Modern 3BD8-1/2 F-M O-P diesels, each rated at 625 h.p., direct-drive F-M 540-KVA 432 Kw. alternators.



# Miner installs power security!

In line with an increasing trend among institutions and industries, the new William H. Miner Agricultural Research Institute near Chazy, New York has installed a complete Fairbanks-Morse diesel-electric plant as positive protection against power failure.

The compact installation shown above features two Fairbanks-Morse Opposed-Piston diesels, direct-driving Fairbanks-Morse alternators.

The plant is completely self-

sufficient. Should the area's hydro power supply fail, a 6-kw. Model 45 F-M diesel-generator set powers a motor-driven starting air compressor and pre-lube pumps to let the operator start one of the big F-M diesels in a hurry.

Find out why F-M two-cycle Opposed-Piston diesel power is unsurpassed for compactness, dependability and economy. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.



## FAIRBANKS-MORSE

a name worth remembering when you want the BEST

DIESEL, DUAL FUEL AND GAS ENGINES • LOCOMOTIVES • ELECTRIC MOTORS • GENERATORS  
PUMPS • SCALES • COMPRESSORS • MAGNETOS • HOME WATER SYSTEMS

kw, which, as is anticipated, will meet the city's needs for a period of approximately three years after installation. The new generating set will be powered by a model 31-A-18 Fairbanks-Morse 12 cyl diesel and will have a 3000 kw Fairbanks-Morse generator. It will be of dual fuel type and will be converted from No. 2 fuel oil to natural gas when the new natural gas pipeline is completed. Other phases of the major improvement program will be the conversion of a portion of the distribution system to higher voltage and the rebuilding of a section of the distribution system plus an addition to the power plant house for the new equipment. This is the largest expansion program which the city has undertaken since 1953 when, at a cost of \$685,000, the city purchased two 1200 kw Fairbanks-Morse diesel generating sets.

Fairbanks, Morse & Co. will supply the four pumping units, each rated at 1040 cubic feet per second, for the new pumping station No. 8 of the giant Central and Southern Florida Flood Control Project. Each pumping unit will be powered by model 38D8½ Fairbanks-Morse opposed piston eight cylinder diesel engines rated 800/1600 hp at 450/-900 rpm. The pumping station, of CBS construction and located on the Miami Canal just south of the Broward-Palm Beach County Line about 42 miles south of Lake Okeechobee, will generally serve the southern half of the Everglades agricultural area. It will help provide rapid removal of flood waters thus affording dependable agricultural use of about 208 sq. miles of tributary lands. This is part of the vast 300 million dollar project designed to tame the rampaging waters of the Everglades in time of flood and to protect southern Florida from drought.

ABOUT a half dozen Allis-Chalmers HD16 crawler tractors with side booms, for handling pipe plus an equal amount with dozer blades, are helping the Harbert Construction Co. lay the new natural gas pipe line in Florida. These are powered with Allis-Chalmers four cycle model 16,000 diesels and are rated 170 hp.

#### Truck Transmission Booklet

A full color, illustrated brochure on Spicer Presto-matic may be had on request from Diamond T Motor Truck Co., 4401 West 26th St., Chicago 23, Ill. Presto-matic, optional on all Diamond T diesels, is said to take the work out of truck driving. Diamond T diesels equipped with the new semi-automatic transmission system have a split gear-shift knob which replaces the clutch pedal. Slight finger pressure on this touch-button automatically engages or

disengages the clutch, allowing the driver to shift gears effortlessly. There is no sacrifice of fuel economy with Presto-matic it is claimed, and there are no pumping losses, for the conventional clutch is retained. Selection of the proper gear is up to the driver; he is in complete control of the truck at all times. Presto-matic merely makes his job easy, according to Diamond T. Smooth en-

gagement from a standing start is automatic, due to a sensing mechanism which synchronizes clutch engagement with the speed of the engine. "Inching" in traffic is accomplished without the driver's having to touch the control. Presto-matic is presently available on Diamond T diesels. Initial cost is said to be quite low, and maintenance is simple.

ITS NEW

**NEW AND NOW AVAILABLE!** The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. LoCienega Blvd., Los Angeles 46, Calif.

*Inspection Report on first Illinois Central Locomotive equipped in August, 1953, with Air-Maze Oil Bath Filter shows...*

## Liners re-used after 64 months service

After 64 months service, Illinois Central's 1200 horsepower switcher, Unit 9437, was shopped. This was the first Illinois Central Unit to be equipped with an Air-Maze oil bath filter.

The following wear data was established upon inspection of the power assemblies:

#### CAST IRON LINER WEAR

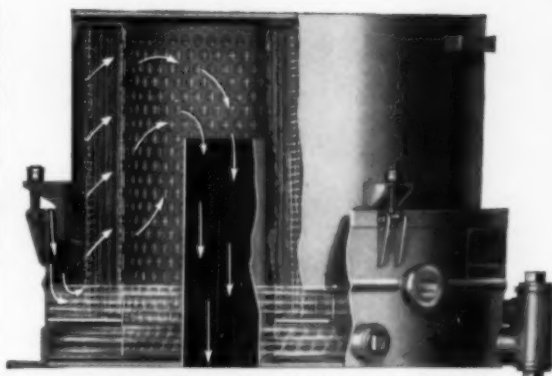
	Average Wear
2" down	.0058"
6" down	.0037"

#### RING GAP INCREASE

	Average Wear
#1 Compression Ring	.063"
#2 Compression Ring	.028"
#3 Compression Ring	.022"

#### CONDITION OF FERROX CAST IRON RINGS

7 of 12 Top Rings	No slick areas
12 of 12 #2 Rings	No slick areas
12 of 12 #3 Rings	No slick areas



To cut engine wear, Air-Maze oil bath filter cleans objectionable dirt from intake air by washing air in a bath of oil. Operates 6 months or longer with minimum maintenance.

Since inspection showed the cast iron liners to be well within tolerance, the liners were cleaned, qualified for re-use and installed in another engine.

Longer liner, piston and ring life results from the Air-Maze oil bath filter's high efficiency in removing abrasive dirt from intake air.

Upwards of 300 locomotives on the Illinois Central have since been equipped with Air-Maze oil bath filters, protecting air intakes on road freight, passenger, as well as, switcher units.

For information, contact your locomotive builder or The Air-Maze Corporation, Dept. DP-6, Cleveland 28, Ohio.

*The biggest names in diesels  
are protected by  
Air-Maze Filters*



**AIR-MAZE**  
The Filter Engineers

ENGINE AIR FILTERS • CAR BODY FILTERS • LUBE OIL STRAINERS • PASSENGER CAR FILTERS



## Michigan-Ohio News

By Jim Brown

MICHIGAN Tractor and Machinery Co. of Detroit has recently delivered three of their new Caterpillar model 14 Graders; two of them to Sugden & Sivier of Oak Park, Mich. and one to MacLean Construction Co. of Lansing. The new model 14 is the only grader available with turbocharged engines, reports Michigan Tractor. The Cat model 14 weighs approximately 15 tons and is powered by a 150 hp Caterpillar diesel engine.

WOLVERINE Tractor & Equipment Co. of Detroit has recently sold two International TD-9 tractors with Drott 4 in 1 Skid-Shovels and special modifications for steel mill application. The new tractors were purchased by McLouth Steel Corp. of Detroit.

BOYS' Vocational School at Whitmore Lake, Mich. has purchased a Cummins HRC-4-I 50 kw, 208 volt, 1800 rpm emergency generator set. The generator set was purchased from Cummins Diesel Michigan Inc. of Dearborn, Mich. and was made up of a Marathon generator and a control panel by Lake Shore Electric of Bedford, Ohio.

ALEX Tugya of Mt. Morris, Mich. has accepted delivery on an Allis-Chalmers model HD6-B tractor equipped with a model 6BE hydraulic bulldozer blade. Sale was made by Earle Equipment Co. of Detroit.

HOUGHTON County Road Commission had its biggest single equipment letting in history recently when bids in excess of \$150,000 were received. Equipment purchased included a Lorain 3/4-yd. shovel; a Northwest 3/4-yd. shovel; a Universal crushing and screening plant; two GMC trucks of 49,000 GVW; and several smaller trucks.

R. G. MOELLER Co. of Detroit recently sold an Austin-Western Pacer "100" grader to J. C. Sachs Co. of Detroit. The Pacer 100 is powered by a GM 4-71 Detroit diesel engine and will be used in street and alley paving.

BALDWIN Bros. of Hastings, Mich. has recently accepted delivery on an International model TD-15 crawler with hydraulic dozer blade. The sale was made by Wolverine Tractor Company of Detroit and Grand Rapids.

A. S. LOEFFLER of Davison, Mich. has purchased a Cummins HR-6-BI rated at 175 hp at 1800 rpm. The new engine was sold by Cummins Diesel Michigan Inc. of Dearborn, Mich. and will be installed by Mr. Loeffler in his Allis-

Chalmers TS-200 scraper unit.

RAY Sablain, Inc. of Lansing, Mich. has purchased a new "long track" Allis-Chalmers model HD6E crawler tractor. Earle Equipment Co. of Detroit made the sale.

A 1/2-yd. P&H model 155K backhoe powered by a P&H model 287C-18 diesel

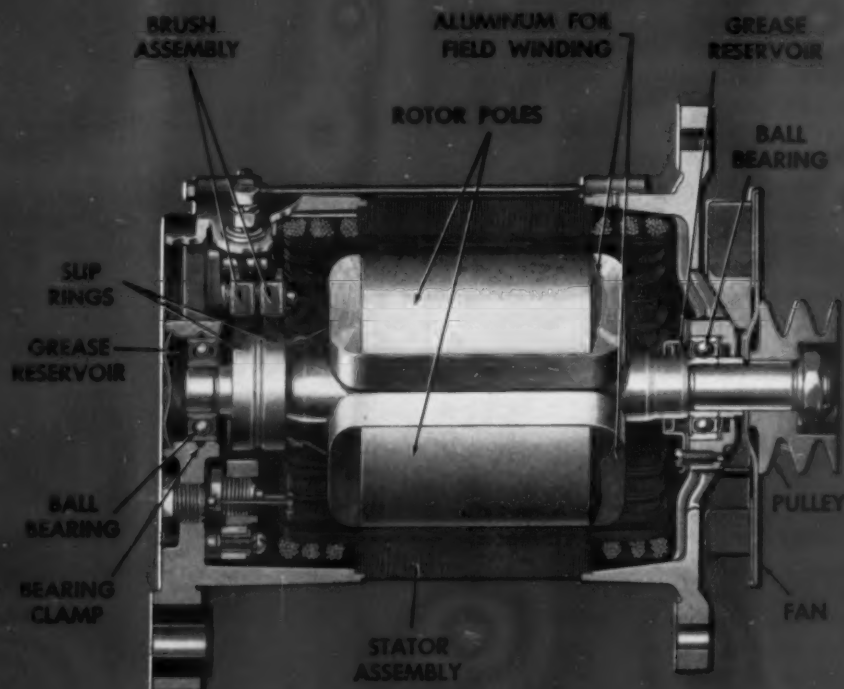
engine was recently sold to Art Costello of Pontiac, Mich. by J. R. Panelli Construction Equipment Co., Inc. of Detroit.

NORTHWEST model 6 dragline with a model 20 Murphy diesel engine and a 2-yd. Page bucket was recently sold by Cyril J. Burke, Inc. of Detroit. The new Northwest will be used for ditching and

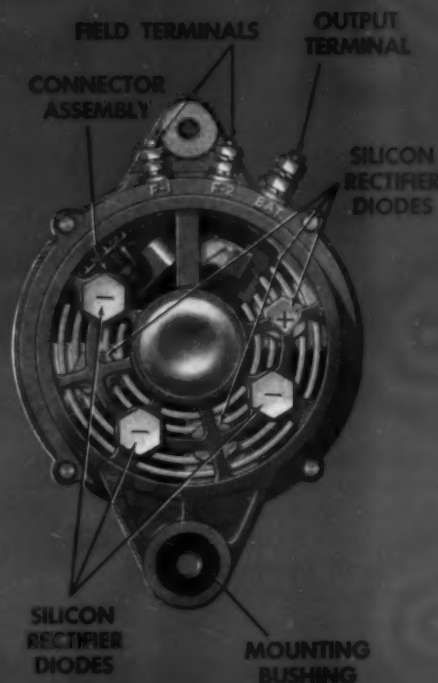
loading and was purchased by Alcona County Road Commission.

R. G. MOELLER Co. of Detroit reports that they now have available the new Ingersoll-Rand 250 cfm air compressor (at 100 lb. pressure with rotary design and 4-wheel mounting) powered by one of GM Detroit Diesel's new engines . . . the 4-53.

## NOW! REAL CHARGE-AT-IDLE,



PROGRESSIVE  
ENGINEERING  
MAKES  
THE  
DIFFERENCE



EARLE Equipment Co. of Detroit and Grand Rapids, distributors of Allis Chalmers, Koehring and other "name-brand" construction equipment is celebrating its Golden Anniversary this year. Fifty years ago Horatio S. Earle established the business under the name of Good Roads Supply Co. A recent "open house" in the new Earle Grand Rapids branch headquarters marked the open-

ing of the company's observance of its 50th year in business. Between 300 and 400 guests attended.

TELFORD Equipment Co. of Detroit has delivered a Cedar Rapids X-2 tandem gravel crushing and screening plant to Mike Telischak of Livonia, Mich. The unit is powered by a Cummins LRT-6-P diesel engine, has a 1236 twin

jaw crusher and a 3025 roll crusher; and is equipped with a 4 ft. x 14 ft. screen. Mr. Telischak plans to use the new crushing and screening plant in a gravel pit in Armada, Mich.

RECTOR Construction Co. of Garden City, Mich. are now using a new Bucyrus-Erie 30-B hoe in their sewer and water excavation work. The new B-E is

powered by a Cat D318 diesel, has a 1-yd. bucket and was purchased from Wolverine Tractor and Equipment Co. of Detroit and Grand Rapids.

CUMMINS Diesel Michigan Inc. of Dearborn, Mich. has replaced a gasoline engine in a Mac B-42 with a Cummins JNS-6-B rated at 175 hp at 2500 rpm. The installation was done for John B. Smith of South Haven, Mich., who hauls freight for Wolverine Express in Muskegon, Mich.

THEW SHOVEL Co. Lorain, Ohio, has announced that they now have a new 2-yd., 4-wheel drive front end loader, called a Lorain Moto-Loader, to replace the Moto-Loader Model ML-156. The new loader will be available with a 110 hp. diesel engine.

MICHIGAN Tractor and Machinery Co. of Detroit has sold a Standby electrical generator set powered by a Caterpillar D311 diesel and rated at 120 kw to Sinai Hospital of Detroit.

INTERNATIONAL TD-15 crawler was recently sold out of the Grand Rapids location of Wolverine Tractor and Equipment Co. to Howard Davis of Harrison, Mich.

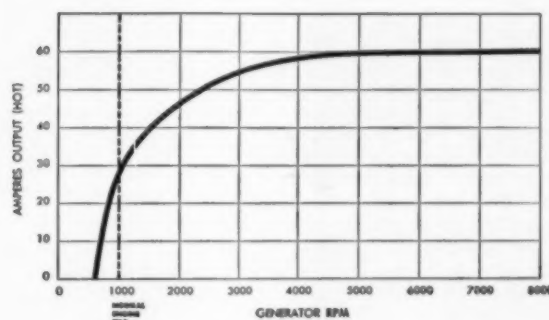
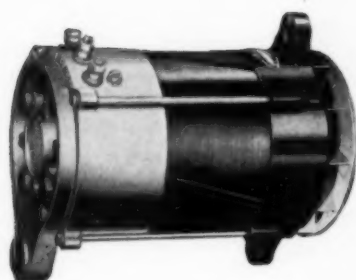
MIKE & PAT Barrett of Dexter, Mich. have accepted delivery on an Allis-Chalmers model HD-11E crawler equipped with an 11BD hydraulic dozer and powered by an A-C model HD-516 rated at 110 gross hp. Sale was made by Earle Equipment Co. of Detroit.

#### REA Plant Managers Meet

At the Rural Electrification Association's 1959 annual meeting held Apr. 6-9, the two DIESEL PROGRESS plant efficiency awards were presented by the Magazine's Editor and Publisher, Rex W. Wadman, to the Division A and B winners: the Caro Mich. plant, Thumb Electric Cooperative; and the Great Bend, Kan. plant, Central Kansas Electric Cooperative, Inc., respectively. The meeting was very well attended as the group picture on page 49 of this issue shows. The papers presented were exceptionally timely and interesting and one of the best attended was the panel discussion on Preventive Maintenance with Robert L. Stanley, Ex. Secretary of DEMA, moderator. Panel members were: J. H. Caldwell, Cooper-Bessemer Corp.; Harry Hansen, Enterprise Engine and Machinery Co.; J. W. Johnson, Fairbanks, Morse and Co.; Lars Karner, Nordberg Manufacturing Co.; and H. P. Yount, Worthington Corp. Topics covered during the discussion were lube oil, bearings, piston rings, gas systems, cooling systems, residual fuels, cylinder liners and turbocharging.

# UP TO TWICE THE TOTAL OUTPUT

## WHEN YOU REPLACE STANDARD D.C. EQUIPMENT WITH DELCO-REMY'S NEW SELF-RECTIFYING A.C. GENERATOR



Here's a completely new generator from Delco-Remy *specifically designed* to take care of cars and trucks with extra-heavy electrical loads under all traffic conditions . . . to increase battery life by eliminating deep cycling.

Designed to mount interchangeably with most standard d.c. generators, this compact new unit is only 5 $\frac{3}{4}$ " in diameter and weighs just 31 pounds. The a.c. design eliminates commutation problems, providing extra-long brush life . . . and the ball bearings are "lifetime" lubricated so that no attention is required between engine overhaul periods. Six specially developed silicon rectifiers built into the end frame eliminate the need for space-consuming external rectifier units, reducing installation time and cost to a minimum.

Be sure to specify this new self-rectifying a.c. generator along with its companion transistor regulator (either full or transistorized model) on your new special-duty equipment for 1959. This all-new power team is still another example of Delco-Remy progressive engineering at work for you.



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DELCO-REMY

DIVISION OF GENERAL MOTORS

ANDERSON, INDIANA



## Mid-West Diesel News

By L. H. Houck

GM powered generator set to B. R. Amon & Sons, Elkhorn, Wis., for driving a Barber-Greene asphalt plant, from Inland GM Diesel, Inc., Milwaukee. Engine is GM 4-71, generator a Delco 75 kw.

TWENTY International DCOT-405 diesel tractors to Be-Mac Transportation Co., St. Louis. Engines are Cummins NHB-600 220 hp, transmissions 10-speed RoadRanger, Page & Page suspension, and single pusher axles.

BALTIMORE Transit Corp., Baltimore, Md., is adding 25 new GMC diesel transit coaches, with air suspension

and power steering. Engines 6-71 GM diesels, cost \$645,000.

VENEZIA BROS., Indianapolis, have repowered an Autocar truck with a 180 hp, NH-180 Cummins diesel from Cummins Diesel of Indiana, Inc., Indianapolis.

CLARKSON Const. Co., Kansas City, three TS-24 Euclid twin-powered scrapers, from Pace-Euclid, Inc., Kansas City, Kan. This unit uses a GM 6-110 in front and a GM 6-71 diesel in rear.

EDWIN SCHRADER, Green Bay, Wis., a Cummins NH-220 from Cummins Diesel of Wisconsin, Inc., Milwaukee, for repowering a Mack LJT.

ELEVEN Dart 40-T, 40-ton end dump trucks to Colombia Iron Mining Co., Desert Mound, Utah. Power is Cummins VT-12 600 hp turbocharged diesels—transmissions, the new Borg-Warner power shift 4-speed transmission and torque converter.

KW-DART Truck Co., Kansas City, has shipped 30 additional 25-ton Dart trucks to Central Electrica de Furnas S/A, Brazil, for use by George Wimpy Co., London, prime contractor on a large hydro-electric project. This makes 40 of these big haulers on this job. Engines are Cummins NHRS-6, 320 hp, transmissions Fuller 10F1220.

INLAND GM Diesel, Inc., Milwaukee, has delivered a GM 6031 diesel unit for a new crushing plant, to Lippmann Engineering Corp., Milwaukee.

TWENTY-FOUR new GMC buses, 51-passenger capacity, to Denver Tramway Corp., Denver, in its replacement program. Engines 6-71 GMC diesels, cost about \$24,000.

TONY FANETTI & Sons, Bloomer, Wis., a 175 hp Cummins JT-6-B for repowering an IHC DCO-195 from Cummins Diesel Sales Inc., St. Paul.

CUMMINS NH-180 to Bill Schott, Jr., Lewiston, Minn., for repowering a Mack

tractor, from Cummins Diesel Sales, Inc., St. Paul.

TWO R-10 rear dump Euclid dump trucks with 4-71 GM diesel engines to Carthage Marble Co., Carthage, Mo., from Pace-Euclid, Kansas City, Kan.

SHEBOYGAN County Highway Dept., Sheboygan, Wis., Cummins HRF-6-B for repowering Oshkosh BG3C from Cummins Diesel of Wis., Inc., Milwaukee.

JAMES SWINDEL, Bloomfield, Mo., has purchased a Cummins NH-180 diesel for repowering an IH AC-225-D, from Cummins Mo. Diesel Sales Corp., St. Louis.

KW-DART, Kansas City, report 75 25-ton KW-Darts hauling rock overburden for Southern Peru Copper Corp., 11,000 ft. high in the Andes mountains. Engines are 320 hp Cummins NHRS diesels, equipped with Twin Disc torque converters. The company is also using KW-Dart smaller units as service vehicles. These engines are 200 hp Cummins NH-600 with Fuller transmissions.

CUMMINS Diesel Sales, Inc., St. Paul, has delivered an NH-220 Cummins to B. M. Hagen, St. Paul, for repowering a Mack LJ and a similar diesel to Earl Muelling, Green Isle, Minn., for repowering an IHC DC-405.

THREE Cummins NH-220's to Quartzite Stone Co., Lincoln, Kan., for repowering Diamond T 921-B's, from Cummins Sales & Service, Inc., Fort Worth, Texas.

BERNARD VOGEL, Nisswa, Minn., bought an NH-220 Cummins diesel from Cummins Diesel Sales Corp., Hibbing, for powering a home-made sawmill.

S. J. GROVES & Sons, nationally known construction firm, operating throughout Middle West, has repowered a Euclid 28TDT dump with a Cummins NHRS-6-BI from Cummins Diesel of Wisconsin, Inc., Milwaukee.

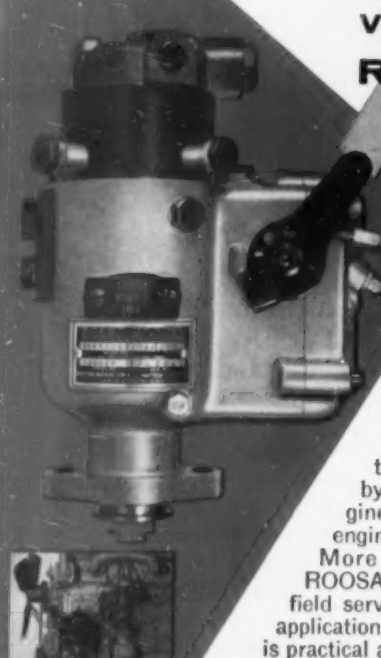
### Detroit Diesel Appoints Florida Sales Representative

The appointment of F. D. Livingston as sales representative of the Detroit Diesel Engine Division of General Motors—Florida Branch has been announced by R. A. Hill, manager of Florida Branches. In his new capacity, Livingston will coordinate the marine diesel sales activities under Roy C. Kuhns, manager of Jacksonville operations. Mr. Livingston's recent affiliations were: Branch Manager of Russel-Hipwell Diesel Engines, Ltd., of Toronto, and Vice President of R. H. Sheppard Diesel Engine Co. of Hanover, Pa.

## More than 40,000 DIESEL ENGINES

are equipped with  
**VERTICALLY driven  
ROOSA MASTER**

**fuel injection pumps**



The vertical pump drive arrangement, pioneered by Hartford Machine Screw Company, is a revolutionary and exclusive ROOSA MASTER feature. The vertical adaptability has saved manufacturers thousands of tooling expense dollars by permitting standardization of engine blocks for gasoline and diesel engines.

More than 40,000 vertically driven ROOSA MASTER pumps in satisfactory field service are proving that the vertical application to existing and new engine designs is practical and sound.

**VERTICAL DRIVE ADVANTAGES:** • Simplicity of installation • Easy accessibility • Shorter injection lines for better performance • Lower cost • Makes available space for other accessories.

**HARTFORD MACHINE SCREW CO.  
HARTFORD 2, CONN.**

*Division Of Standard Screw Company*



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ROOSA MASTER**

You can depend on the diesel that depends on ROOSA MASTER

## KEEP YOUR ENGINES RUNNING CLEAN AND LONGER

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WITH FULL FLOW AND BY-PASS FILTERS  
FOR ENGINE LUBE AND FUEL OIL

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## New Allis-Chalmers Bulletins on Gas Engines and Power Units

Two new catalogs covering the Allis-Chalmers G-226 and the G-149 engines and power units are now available from the Engine-Material Handling Division, Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis. Both catalogs, BU-528 (G-149) and BU-531 (G-226) tell the design, engineering and performance capabilities of the units with the help of numerous illustrations, including a center spread devoted to a cross section of the unit with descriptive marginal notes. Optional equipment available is also listed.

ITS NEW

## Field Sales Administration Manager for American Air Filter

Mr. John W. Frazier has been appointed Manager of Field Sales Administration for American Air Filter Co., Inc. He has been acting in this capacity for the past four months. Prior to that he was manager of the merchandise division. Mr. Frazier, in his new position, is responsible for the maintenance of an effective sales organization, sales training, field sales promotion, technical training programs, and the promotion and coordination of combined sales efforts. He is located at the firm's Home Office in Louisville, Ky.

## Device Simulates Atomic Power Plant

An instrumented unit that "realistically" impersonates a full-scale atomic power plant and solves nuclear design and operational problems has been developed by Brown Instruments division of Minneapolis-Honeywell Regulator Co. The "thermal plant simulator" is said to duplicate the operating characteristics of virtually every type of nuclear power plant when linked to a reactor simulator. Mr. C. L. Peterson, vice president of the Honeywell division, said it "will simplify, safely and economically, the training of nuclear engineering personnel for the nation's expanding atomic energy program." Although the thermal simulator was developed primarily as a training device for use by colleges and universities, he explained, it can be used independently for studies and experiments in the design and operation of nuclear power plants. To be operative, the thermal simulator is connected to another Honeywell device, a reactor simulator that behaves the same as a reactor using fissionable fuels. In actual practice, atoms are bombarded in a power reactor with neutrons. Thermal energy created in "splitting" the atoms heats coolants such as water, gas, liquid metals or organic fluids. The transfer of this heat to heat exchangers produces steam which drives the turbines and in

turn generate the steam.

The thermal plant, Honeywell nuclear engineers said, can simulate operation of the 60,000 kw pressurized water power plant at Shippingsport, Pa., the sodium-cooled plants being built at Lagoona Beach, Mich., and Hallam, Neb., the water-cooled plant under construction at Rowe, Mass., and the 40,000 kw gas-

cooled nuclear plant planned by Philadelphia Electric Co. Reactions and effects of these power plants, it was explained, are duplicated by analog (electrical) computing circuits that simulate the heat transfer in a steam generator. Instruments identical to those on real reactors supply signals from the reactor simulator to the thermal simulator which, in turn, controls the rate of fis-

sion. The only kind of atomic power plant that cannot be simulated is a boiling-water reactor. This type does not make use of heat exchangers. The thermal simulator has a patchboard in which certain values can be programmed to simulate hypothetical power plant conditions. Reactor simulators developed by Brown Instruments are now in use in eight U.S. universities.

ITS NEW

NOW YOU CAN STANDARDIZE WITH THE

# all purpose power line

(20 TO 1650 H.P. IN ONLY 3 CYLINDER SIZES)

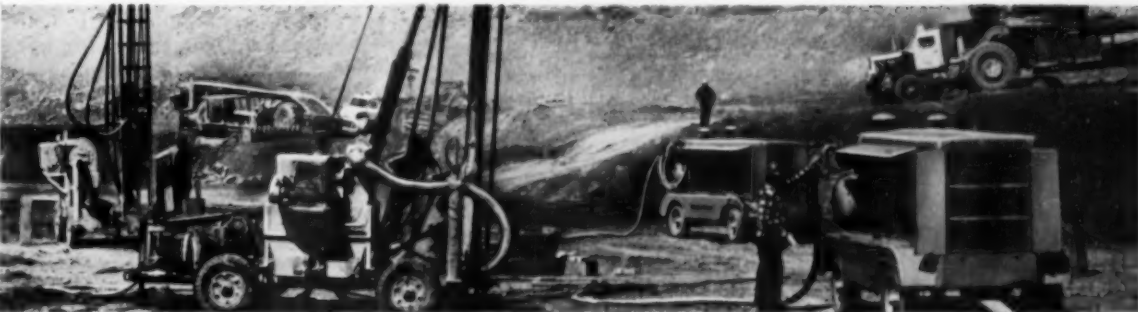
... and get all the benefits of GM Diesel standardization in any type of equipment built by over 250 leading manufacturers



Standardization with GM Diesel engines pays off big for contractors because fast-stepping, 2-cycle "Jimmy" Diesels power the finest equipment—get work done faster



GM Diesel covers the power spectrum—20 to 1650 H.P. with only 3 cylinder sizes—compared to the 5 to 10 cylinder sizes which other Diesel manufacturers use



Contractors who standardize on GM Diesel power need stock, at most, only 3 sizes of wearing parts—maintain full protection with the smallest investment in spares



**GM  
DIESEL**

PARTS AND  
SERVICE  
WORLDWIDE

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario

DETROIT DIESEL ENGINE DIVISION,  
GENERAL MOTORS, DETROIT 38, MICH.



## Instrument Techniques Increasing in Volume

Advanced instrument techniques are available to the already highly automated petroleum and petrochemical industries in greater volume than ever before, a Minneapolis-Honeywell Regulator Co. spokesman told the annual Petroleum Industry Electrical Association

meeting at Galveston, Tex. "Receiving major consideration by all phases of the two industries," said J. T. Teed, petroleum industry market manager for Honeywell's Brown Instruments division, "are miniature electric recording control systems, automatic data loggers and industrial process computers. While most new techniques are electrical in principle, pneumatic instrumentation will

continue to play an important role in petroleum and chemical processing. Pneumatic instrumentation has been in use for many years and very successfully. In fact, its use will increase because the principles of pneumatic instrumentation are well understood." Teed predicted, however, that the rate of usage of miniature electric instrumentation will be greater than for pneumatics over the next several years. "Factors contributing to the growing acceptance of electronic instrumentation," Teed said, "include fast transmission speeds, compatibility with new electrical sensing devices, data loggers and computers, improved solid state components, and flexibility of electric systems."

ing, and auxiliary pumping arrangements, are illustrated and described. Quick estimation charts and tables show capacity ranges for the four sizes, thus aiding correct selection of accessory heaters for applications where they are needed. Copies of Bulletin 2141 are available on request from Centrico, Inc., 75 West Forest Ave., Englewood, N. J.

**ITS NEW**

## This Yates-American "first" now **STANDARD IN THE INDUSTRY**



**FIXED BUNDLE DESIGN:** Flanged baffles — pioneered by Y-A — give extra-wide, leak-proof contact between tubes, baffles and shell for more effective liquid seal, less tube wear.

## Y-A Heat Exchangers

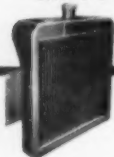
*combine high efficiency cooling with valuable space-conserving design*

**ROLLED TUBE JOINTS:** Industry-accepted standard of quality construction.

**WIDE CHOICE OF MATERIALS:** Copper, steel, brass, bronze, stainless steel, Admiralty, and special materials on request.

**FIXED AND REMOVABLE BUNDLE:** Single and multiple pass designs. Fixed bundle from 2" to 10" dia. Removable bundle 5" to 31" dia. Other models available on special order.

*Wherever there's a heat transfer problem — whether with diesel engines or hydraulic equipment — there's a Yates-American exchanger to solve it.*



## Radiators

For 30 years, Y-A heat transfer products have proved themselves in the toughest assignments. Whatever your requirements, from die-drawn brass tanks to fabricated steel, Y-A can help you.

HEAT TRANSFER DIVISION  
**YATES-AMERICAN • Beloit, Wisconsin**



## Brochure on Heavy-Duty Converters

National Torque Converters for heavy industrial applications is the title of Bulletin No. 496 issued by The National Supply Co., Pittsburgh. The new 12-page bulletin covers both the general advantages of torque converters and the special features of National equipment, which were first proved on the company's oil well drilling rigs. Design and principle of operation are illustrated. The bulletin includes illustrations of excavating equipment on which the converters are used and explains their advantages in use with electric motors for driving heavy machinery. A list of 80 engines made by 12 manufacturers, and a selection chart, show how National's 17 hydraulic circuits are matched with all engines in the 100 to 1000 horsepower range.

**ITS NEW**

## Centrico Publishes Bulletin On Four Centrifugal Separators

Attractively printed in three colors, this eight-page bulletin describes Westfalia type OG heavy-duty centrifugal separators, which are designed for purifying and dewatering lubricant and fuel oils in marine and stationary power plants. The Westfalia OG heavy duty oil Separator is available in four models: OG-2016, OG-4016, OG-8016, OG-10016. Explanatory text is illustrated with cross sectional diagrams printed in color so that the separating action of the units can be easily traced. Both conventional and alternate schemes of purification are presented: Where appreciable water is present, the disc and bowl arrangement of the centrifuge is set up to expel separate streams continuously while collecting suspended solids inside the solid bowl; in cases where water is not a problem, the same centrifuges can be set up to collect these solids without water stream piping connections so that all solids and sludge are retained in the bowl. In either arrangement, hydraulic bowl lifters for sludge removal and clean-

## Latest Issue of Fuller Transmission Topics Available

Fuller Manufacturing Co. has released Volume 8, Number 2, of Transmission Topics magazine. This issue features the announcement of Fullair control, Fuller's new system of shifting gears entirely by the means of compressed air. Also featured are the Fuller pressure filtration and lubrication systems, now standard on several Fuller off-highway transmissions. An excerpt from a statement by J. Robert Cooper, president, American Trucking Associations, Inc., expresses Cooper's confidence in the future of the trucking industry. Also in this issue is a review of Private Trucking Costs and Records, a study published by Texas Transportation Institute, a part of the Texas A. & M. College System. Commercial freight carriers featured are: Braswell Motor Freight Lines, Inc., El Paso, Tex.; Be-Mac Transport Co., Inc., St. Louis; Pilot Freight Carriers, Inc., Winston-Salem, N.C.; Jack Cole Co., Inc., Birmingham, Ala.; and Inland Motor Freight, Spokane, Wash. Two private fleets covered are those of Behlen Manufacturing Company, Columbus, Neb., and Rhodes & Jamieson, Oakland, Calif. In addition, Transmission Topics features two truck operators and leasers, Kenneth L. Carman, Shrewsbury, Pa., and Ralph Determan, Minneapolis. Equipment manufacturers featured in the magazine include Timberland Machines, Ltd., Woodstock, Ont.; Eaton Manufacturing Co., Cleveland; Parsons Co., Newton, Ia.; and The Thew Shovel Co., Lorain, Ohio. A copy of the new Transmission Topics may be obtained by writing to the Fuller Manufacturing Co., Transmission Division, Kalamazoo, Mich.

**ITS NEW**

## Power Plant Automatic Controls

A 12-page engineering bulletin on application of electronic controls for power generating stations is released by The Cooper-Bessemer Corp., Electronic and Controls Division. The bulletin describes application of newly developed automatic controls for sensing power loads, starting, regulating and shutting down engine-generating units to meet varying line demands. Bulletin No. E-88 is available by writing The Cooper-Bessemer Corporation, Mount Vernon, Ohio, attention: F. L. Friedli.

**ITS NEW**

**DIESEL PROGRESS**

### New Plant Manager at Perfect Circle

G. Luther Parsons has been appointed plant manager of Perfect Circle Corporation's main plant in Hagerstown, Ind. Announcement of the appointment was made by M. H. McKinnon, machining division manager who has also been acting Hagerstown plant manager. Mr. Parsons has been with Perfect Circle since 1934 when he was hired as inspector. Since that time, he has worked in nearly every department in the plant. He was supervisor of machine repair, later becoming a process engineer, then a tool engineer and assistant master mechanic. In 1951, Parsons became tool room superintendent and in 1955 became superintendent of all maintenance as well as tool room activities in the Hagerstown plant. He is a member of the American Society of Tool Engineers.

### B&W Service in the Port of New York

Golten Marine Co. Inc., New York, N.Y., has been named by Burmeister & Wain as a licensed repair shop and approved spare parts supplier for B&W-engined ships calling at the port of New York or other Eastern Seaboard ports of the United States. Under this agreement, Golten Marine Co., which for many years has performed diesel repairs and recently expanded and moved into new premises in the heart of the port of New York, shall be able to repair B&W main and auxiliary engines and manufacture spare parts for these engines in accordance with original B&W drawings and advice from its technical staff. Golten Marine Co. will also be able to deliver original B&W-manufactured spare parts from a stock which will be placed within its premises. These activities will be carried out in close co-operation with Burmeister & Wain American Corp., Mystic, Conn., and its branch office in New York.

### Single Phase Chargers Announced

A complete line of silicon battery chargers featuring a wide variety of new features has just been announced by the Acme Electric Corp., Cuba, N.Y. The single phase Magnistrol chargers are specifically designed for float charging battery installation ranging from 10 cells to 63 cells in five basic amperage capacities in three voltage ranges. The units are readily adjustable for charging lead acid, nickel-alkaline or nickel-cadmium batteries. Three phase input chargers are also available for larger capacity installations. Designed around new circuitry, the units have hermetically sealed, non-aging silicon diodes operating with a minimum of 100% safety

factor. In addition to a uniquely designed, transistorized control, the chargers provide  $\pm 1\%$  voltage regulation and current limiting feature. The control permits no oscillation of output when the unit is operated with the battery or load disconnected. An additional feature permits no peaking of output voltage after the battery is up to full charge. For maintenance and inspection,

the unit is constructed to permit complete accessibility to all components. The instrument panel is integral with the chassis. The line is available for wall, relay rack or floor mounting. Acme Electric, will supply complete technical literature and price schedules upon request to Custom Equipment Division, Acme Electric Corp., 351 Water St., Cuba, N. Y.

ITS NEW

**NEW AND NOW AVAILABLE!** The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. LaCienega Blvd., Los Angeles 46, Calif.

*Here's where people see eye to eye...*



*With folks who know filters...*

# FRAM RANKS FIRST!

Over 400 Engine Manufacturers install FRAM Filters as original equipment—more than any other filter!

If you have a filter problem, FRAM has the wide range of experience and research facilities to help you find the most practical solution in the shortest time. Phone or write **FRAM CORPORATION, Providence 16, R. I.**





## New Assembly and Service Tool

A new 1/2 in. drive heavy duty electric impact tool has just been announced by Ingersoll-Rand. Known as the size 5U-HD Impacttool, it delivers more power than standard duty 1/2 in. drive tools. With it, mechanics can capably handle the toughest nuts and bolts. The 5U-HD Impacttool is the answer to the increased requirements of assembly and maintenance work . . . its heavy duty power quickly does the job. In spite of this heavy duty power bonus, the size 5U-HD is light in weight and easy to handle. The powerful universal heavy duty electric motor is used and a compact T-type anvil makes the impact mechanism more efficient, delivering more power per blow. The hammer case nose of the 5U-HD is built to last, and the rubber nose cap effectively keeps dirt out and prevents scuffing. A new sturdy socket retaining pin in the square driver is through-hardened for long life; positive retention also features easy replacement

without special tools. The heavy duty switch is totally enclosed and steel inserts in the housing provide great gripping area for the screws which hold the hammer case to the motor housing. The size 5U-HD heavy duty Impacttool is 10 1/4 in. length and weighs only 6 lb. 4 oz. less cable. The tool delivers 1900 impacts per minute, and runs at a free speed of approximately 1900 rpm. It is available for 110V or 220V operation ac-dc (25-40-50-60 cycle) and is approved by Underwriters Laboratories, Industrial Type. For more information write Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., requesting form PL-5252.

**ITS NEW**

## Vertical Marine Pump Fliers

Three new 6-page, 2-color companion-type fliers featuring Ingersoll-Rand's vertical marine pumps classes VCM, VBM and VHM have recently been made available. These pumps are volute-type units with vertically-split casing

which makes it possible to inspect or dismantle the pumps without disturbing the suction or discharge nozzles. VCM, VBM and VHM pumps are designed for main and auxiliary hotwell service, main and auxiliary circulating service, bilge and ballast service, etc. VCM and VBM are single-stage units, while the VHM is a two-stage design. The ratings of these pumps are as follows: VCM—pressures to 50 psi, capacities 325 to 22,000 gpm sizes 5 to 24 inches, temperatures to 150° F; VBM—pressures to 75 psi, capacities 30 to 650 gpm, sizes 1, 2 and 3 inches, temperatures to 150° F. and VHM—pressures to 125 psi, capacities 20 to 400 gpm, sizes 1, 2, 3 and 4 inches, temperatures to 212° F. Additional information on the features and applications of these pumps are included in these fliers. Also incorporated are cross sectional views, and external views of the pumps. These also include materials and mechanical design features tables as well as complete dimensions. Copies of these new fliers, forms 7591, 7592 and 7593 can be obtained by writing to Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y.

**ITS NEW**

## Director of Manufacturing Appointed by Hercules

Mr. Adolph A. Karrasch, veteran truck engine production man for International Harvester Co., has been appointed director of manufacturing of Hercules Motors Corp., William L. Pringle, president, has announced. For the past year, Karrasch has been assistant works manager of International Harvester's Motor Truck Plant at Fort Wayne, Ind. During his 22 years with IHC, he has served as general superintendent at the Indianapolis Works and in various positions in the Milwaukee, St. Paul, Chicago and Louisville plants.

## Steam-Jet Cleaner Introduced by Pantex

Faster steam cleaning for repair and overhaul shops is made possible with a new, 100 gph., portable, oil-fired steam-jet cleaner just introduced by Pantex Manufacturing Corp., Pawtucket, R.I. Identified as the Speedysteam 100, the unit provides automatic operating convenience and economy. Mounted on four large, rubber-tired wheels, the new cleaner is a completely enclosed, compact machine with built-in soap tank and controls. It can be operated on kerosene or #1 or #2 fuel oil. Ignition is fully automatic and fuel pressure is modulated to develop the gun-nozzle pressure desired which is shown on an easily visible gauge. Heating coils are 1/2-inch in diameter, continuous wound for maximum efficiency and tested for 1,000 psi. Also, as standard equipment, the cleaner incorporates a water float

tank with an anti-siphon valve. This assures uniform water flow and, at the same time, avoids danger of supply contamination, as required by law in many states. One switch and valve produces adjustable, automatically controlled cleaning pressures from 50 to 150 psi. in 90 seconds. Delivery at 100 gph. is accomplished with a rotary, valveless pump. Complete details are available from the Steam Generator Division, Pantex Manufacturing Corp., Pawtucket, R.I.

**ITS NEW**

## Nine New Aeroquip Distributors

Aeroquip Corp., Jackson, Mich., has appointed the following distributors to supply Aeroquip industrial products locally. The announcement was made by M. Lloyd Jones, Aeroquip manager of distributor sales: Gilan Auto Supply, Box 1769, Fort Myers, Fla.; Air Cleaner Sales, Inc., 2520 Larpenter Ave., W., St. Paul 13, Minn.; Joint & Clutch Service, Inc., 977 W. Washington St., Indianapolis 22, Ind.; Johnson Hydraulic Equipment Co., 78th and Lyndale St., Minneapolis, Minn.; Reliable Rubber Products Co., 913-15 Wayne Ave., Dayton 10, Ohio; Arrow Engine Service, Inc., 3873 N. Palmer St., Milwaukee, Wis.; Eggman Motors, 834 S. Park St., Madison, Wis.; R. L. Miller Co., 1206 Lakemont Dr., Pittsburgh 16, Pa.; and J. V. Tripoli & Co., Inc., 1622 Fillmore Ave., Buffalo 11, N.Y.

## Illinois Auto Electric Opens New Chicago Plant

Illinois Auto Electric Co. has opened its new Forest View Division plant located at 4750 S. Central Ave. in Chicago. According to Joseph F. Sirotek, Jr., president. The 16,000 sq. ft., column-free plant and parts warehouse is designed to permit all types of industrial transportation equipment free access to any part of the shop service area. Located on a five-acre lot near Midway Airport, the new service center offers shop service facilities, engineering and installation service, sales, stocks, repair and exchange service for all types of fleet and industrial transportation equipment. The new location also has a two-acre parking lot, customer snack room and parts stock room. Illinois Auto Electric Co. was formed in 1915 on Chicago's South Side and has grown to become one of the nation's largest independent distributors of transportation and industrial supplies. It stocks an inventory of over 60,000 transportation parts and supplies and also offers complete service for fleet and industrial transportation equipment at its general headquarters building, 2037 S. Indiana Ave.

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- ☐ Jet engine exhaust and intake
- ☐ Internal combustion exhaust and intake
- ☐ Air compressor intakes and discharges
- ☐ Blower intakes and discharges

## New Traction Equalizer

Of interest to operators of both off-the-highway and over-the-highway units is a new traction-improving device just announced by the Transmission and Axle Division of Rockwell-Standard Corp. Known as the Rockwell traction equalizer, it imparts to the wheel with the best road adhesion a substantial increase in tractive effort. So effective is this new device that it will propel a vehicle even if one of the driving wheels is completely off the ground. Not only does the truck equipped with this unit have traction under any and all conditions but it is far easier to control on curves, slippery pavements and soft ground, according to Rockwell engineers. The tendency of the vehicle to swerve when one wheel suddenly loses traction is eliminated because wheel spinning is reduced. Because the unit is continually engaged and doesn't depend on the driver for activation, it is automatically effective whenever one wheel tends to turn faster than the other. With multi-drive axle vehicles, each axle may be equipped with the unit. Simplified maintenance is claimed for the unit which is self-lubricating. It is equipped with scoops which pick up lubricant and work it through the unit as it operates. Installation is easy. Since the differential nest remains standard, the only new parts required to install the unit are axle shafts and differential cases.

ITS NEW

## Automatic Air Filter Available in Horizontal Design

The American Air Filter Co. announces the new type H Roll-O-Matic, automatic renewable-media air filter. Operation is completely automatic. The new unit requires an absolute minimum of maintenance, and filter resistance is constant. The principle of operation is the same as that used in AAF's Roll-O-Matic air filter proved in over 10,000 installations since 1954. The renewable media consists of a specially woven curtain of glass fibres which traverses the face of the filter and rolls up collected air contaminants, with used media, into a disposable roll at the side. The horizontal design is ideal for application on new or existing multi-zone air conditioning units, heating and ventilating units, industrial heaters, or other types of air conditioning units. The type H Roll-O-Matic also answers the need for horizontally designed filters in ventilating systems where limited headroom is a factor.

Field tests show that the type H Roll-O-Matic is well suited for central station use. Filtering efficiency is high and filter resistance remains constant because new

media is automatically introduced before resistance can build up. A drive mechanism actuated by cascade timers automatically feeds media across the face of the filter at a pre-determined rate, depending on filter size and dust conditions. The type H Roll-O-Matic can be arranged two units high for those applications where the additional capacity is necessary. This arrangement still requires only one drive and timer assembly. The unit is available in 10 sizes ranging in capacity from 4,070 to 39,000 cfm. For further information on dimensions and capacity, Bulletin No. 247 describing the type H Roll-O-Matic is available on request. For greater detail on operation and basic filter design write for Bulletin No. 248-C, model B Roll-O-Matic, c/o Dept. PD, American Air Filter Co., 215 Central Ave., Louisville, Ky.

ITS NEW

## Loneragan Appoints J. J. Soukup

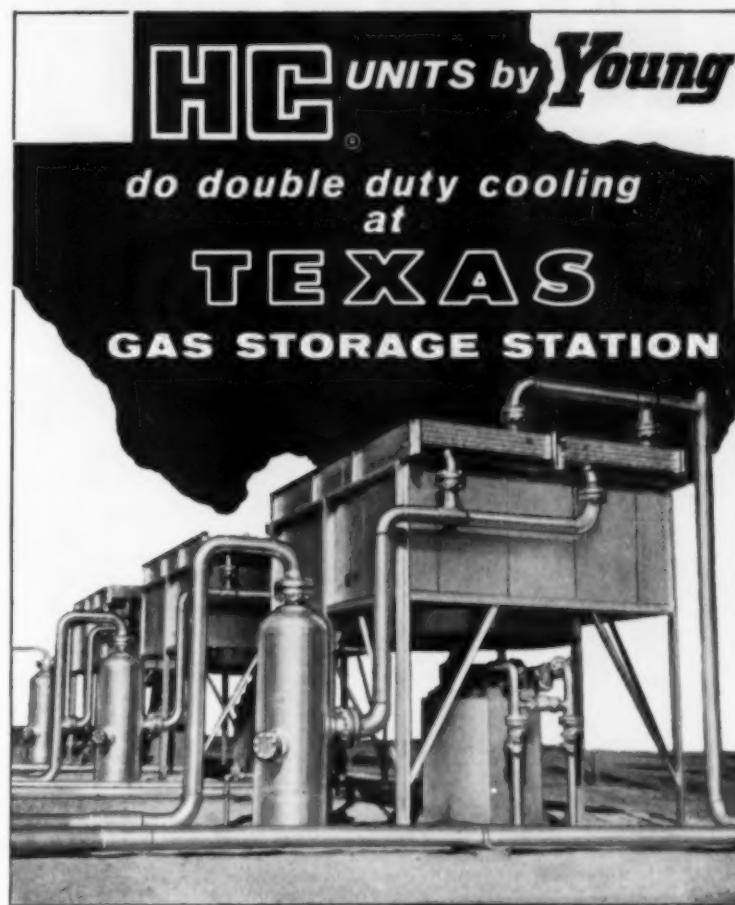
Mr. John J. Soukup, formerly associated with valve sales in the Midwest, has joined the J. E. Loneragan Co., Philadelphia valve manufacturer, as a sales engineer. Announcement of the appointment was made by Edward Nahill, company sales manager. The 87-year-old Loneragan Co. markets its safety valves, relief valves, and pressure gauges to the power, process, and mechanical industries. In his new assignment Soukup will coordinate steel valve sales out of Philadelphia. He received his education in Illinois, where he attended the University of Illinois engineering school and the Illinois Institute of Technology. Before joining the Loneragan Co., he was a sales representative for John L. Schmidt Co., St. Paul, Minn., and Chicago district manager for Crosby Gauge & Valve Co.

## Diesel Drives Unique Train

Portland, Oregon is acquiring a new measure of fame these days for what is called "The most elaborate and picturesque home-sized railroad anywhere in the United States." The Portland Zoo Railway Co. has put the slick diesel-powered train into service to take youngsters and adults through beauty spots of Portland's fabulous new zoo. The diesel locomotive pulls four aluminum coaches over 3400 ft. of 30 in. main line track, which runs over a viaduct above the bear pits to a temporary loop, turns around and returns to a terminal near the entrance of the zoo grounds. Power for the 6½ ton diesel locomotive is supplied by a 140 hp Cummins model JS-6-IP diesel engine driving through a torque converter. The train carries 99 adults or 132 children. Plans are to extend the main line over a 2½ mile

route as more funds become available. The "Zooliner" was designed and built at cost with the help of many volunteers and business concerns. John Flaschner of Northwest Marine Iron Works designed the train. The Cummins distributor in Portland, R. H. Wills, and the parent company in Columbus, Ind., worked with other manufacturers and suppliers to make this an actuality.

**NEW AND NOW AVAILABLE!** The completely new 1959 edition of the **DIESEL ENGINE CATALOG**, Volume 24 can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs \$10 postpaid anywhere in the world. Send checks or company orders to **DIESEL ENGINE CATALOG**, 816 N. LaCienega Blvd., Los Angeles 46, Calif.



Pictured are three Young Radiator Company HC-1210 coolers handling Gas Inter-Cooling at the Tri Cities Station near Athens, Texas

The Lone Star Gas Company utilizes six HC atmospheric coolers by Young at their gas storage station near Athens, Texas. Three of these units cool Engine Jacket Water and Lube Oil on three 1350 hp Cooper-Bessemer 2-cycle Engines. The other three units do the Gas Inter-Cooling, and are designed to handle a total of 48 MMCFD to 78 MMCFD under varying conditions... up to 1500 psi working pressures. Young HC Units are built for rugged service. Their versatility means you get job-matched performance, according to the requirement of the heat transfer problem. Young Design and Engineering experience in the Oil Field, Petro-Chemical and Chemical Processing industries is yours for the asking. Call or write your nearest Young representative about your present or future Heat Transfer problems. No obligation of course.

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| 2. Louis J. Cercone & Assoc.<br>Buffalo 13, New York      | 6. J. R. Meek Company<br>Tulsa, Okla., Houston, Texas   | 10. Young Radiator Company<br>Suite 213-205 W. Wacker Dr.<br>Chicago 6, Illinois |
| 3. Dutton-Williams Bros. Ltd.<br>Calgary, Alberta, Canada | 7. Schneider Electric & Equip. Co.<br>Omaha 8, Nebraska | 11. Young Radiator Company<br>Rm 407-51 E. 42nd St.<br>New York 17, New York     |
| 4. Flournoy & Everett, Inc.<br>Downey, California         | 8. Frank Wolf<br>Denver, Colorado                       |  |

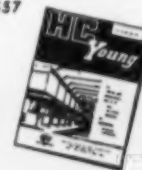
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## Murphy Appoints Cramer Assistant Chief Engineer

Appointment of Robert Cramer, Jr., as Assistant Chief Engineer of Murphy Diesel Co., Milwaukee is announced by the Company's Chief Engineer, Ross Taylor. Mr. Cramer joins Murphy from Nordberg Manufacturing Co. where he was Chief, Technical Engineering, En-

gine Division. A graduate of Marquette University where he earned his mechanical engineering degree in 1930, Cramer has had many years experience in the design, construction and testing of diesel engines and other prime movers. He is a member of the A.S.M.E., serving as chairman of the Oil & Gas Power Division in 1952-1953 and currently is a member of several of that Division's

committees. He is also a member of the Society of Automotive Engineers and the Diesel Engine Manufacturers Association. In 1957, Cramer was a member of three man U. S. Secretariat attending Zurich meeting of the International Combustion Engine Congress. Mr. Cramer holds several U. S. Patents and is a Registered Professional Engineer (Wisconsin).

of the national marketing programs of industrial hose products.

## U. S. Will Now Enforce Use of Spark Arrestors

The use of spark arrestors in trapping dangerous exhaust carbon is now required on internal-combustion engines working on Federal lands where vegetation is flammable. Many state governments, awaiting these findings, are expected to adapt similar requirements where local control applies. That could be in farm areas as well as in oil fields, airports, warehouses and in other places where exhaust carbon is considered a hazard. According to the recent directive of the U. S. Department of Agriculture Forest Service, spark arrestors are required to prevent fires known to be caused by incandescent exhaust carbon from trucks, tractors, and other diesel equipment working in grass, stubble, brush and timber. Heretofore, Federal and local laws telling when and where to use spark arrestors could not be enforced as there were no standards for spark-arrestor performance acceptable to law-enforcement agencies.

To safeguard the buyers of spark arrestors so that the arrestors will be acceptable for use in Federal forests and in other hazardous areas, the arrestors must be permanently stamped by its manufacturer with its U. S. Forest Service rating. The rating is determined by the ability of the spark arrestor to trap dangerous exhaust carbon from the engine over all of its operating ranges. Also, that there is an acceptable back-pressure, good durability, and full rated-performance for the life of the arrestor. As the various state agencies have long wanted a reliable standard-of-adequacy for spark arrestors, their full cooperation in adapting the Federal standards is expected immediately. For the past few years, large Western utility companies and timber producers have been installing Gill Spark Arrestors. They are almost 100 per cent efficient, according to the manufacturer, in safely trapping exhaust carbon of the engine from idling to full throttle, and exceed all test-requirements of the Forest Service. According to Art Spleiss of the Erickson Products Co., San Francisco, manufacturers of the Gill Spark Arrestors, those of you responsible for the operation of tractors, trucks, and other equipment working in hazardous areas, would be wise at this time to talk to the U. S. and State Forest Service or fire-prevention personnel about spark arrestors. These people will gladly help you in deciding where and when to use spark arrestors.

Volume 24, the 1959 Edition of the **DIESEL ENGINE CATALOG** is now available at \$10.00 per copy. Send check or company order to **DIESEL ENGINE CATALOG**, 816 N. La Cienega Blvd., Los Angeles 46, Calif.

## Industrial Control Switch

A new enclosed switch listed by Underwriters' Laboratories as being raintight as well as explosion-proof has been introduced by Micro Switch, Freeport, Ill., a Division of Minneapolis-Honeywell Regulator Co. Catalog listing 2CX3 has aluminum die-cast housing and dome cover. It is designed for use on fuel handling equipment, industrial valve control systems, etc. Underwriters' Laboratories lists the switch as being suitable for use in Class I (vapor-air mixtures)—Groups C and D; Class II (dust-air mixtures)—Groups E, F, and G. Electrical capacity is UL listed at 20 amps, 125, 250, or 460 vac. The 2CX3 also is capable of undergoing a 100-hour salt fog test without injury to the actuating mechanism or precision switching units. There is a ring-type seal on the actuator shaft and between the cover and case, and the stainless steel lever arm actuator has a non-sparking roller. The arm is field adjustable through 360 degrees and from one to 3½ inches in length. Contact arrangement consists of two single-pole, double-throw replaceable switching units. The roller arm is moved clockwise to actuate one unit and counter-clockwise to actuate the other unit. Another design is available which actuates both units when the arm is moved in either direction. Data Sheet 156, which may be obtained by writing Micro Switch in Freeport, has photographs, dimension drawing, characteristics, electrical data and mounting information.

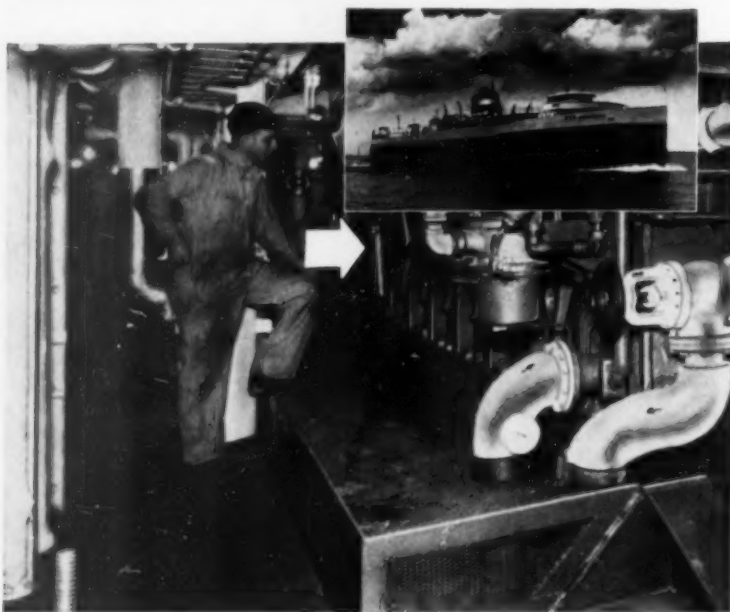
**ITS NEW**

## Flexonics Names Marketing Manager

Mr. Robinson F. Edgar has been appointed marketing manager of the Industrial Hose Division at Flexonics Corp. according to an announcement by Eugene A. Ransom, general manager of the Industrial Hose Division. For the past twelve years Edgar has been employed by the Warner Electric Brake and Clutch Co. He began his career as an application engineer and progressed to district manager, regional manager, manager of marketing and general sales manager of their industrial division. Mr. Edgar will be located at the headquarters of the Company's Industrial Hose Division in Rock Falls, Ill. As division marketing manager he will be in charge

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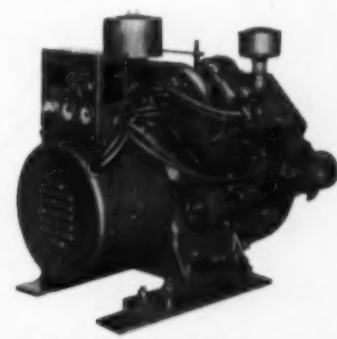
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## Filter Designed for Pressures to 750 psig

The new SS7.5C CFC Fulflo Filter, made with a durable one-piece shell of type 316L stainless steel, is designed for operating pressures up to 750 psig. It is recommended for all operations requiring minimum chemical reaction between the filter and liquid or gas being filtered. Numerous applications include compressed air, gases, hydraulic



fluids, liquid fuels, liquid chemicals, lubricating oils and water. The filter employs a 10 in. honeycomb filter tube. Tubes are manufactured in a wide range of precision densities to provide any

degree of continuous micro-clarity, down to 1 micron. Tubes are available in cotton, nylon, orlon, dynel, acetate or glass fibres. Cores are of plain steel, No. 316 stainless steel, tinned steel, copper, tinned copper, nickel, PVC, or phenolic-impregnated paper. Maximum air flow rate is 650 scfm at 750 psig operating pressure with initial pressure loss of 3 psi. Flow rates for liquids varies according to nature of fluid and operating conditions, with maximum of 5 gpm for liquids of aqueous viscosity. Straight line pipe connections (dry seal thread) have standard 1/4 in. NPTF. A new technical data sheet is available on request to Commercial Filters Corp., 2 Main St., Melrose, Mass. Ask for Bulletin S-600.

**ITS NEW**

## Remote Solenoid-Operated Breaker

A remote, solenoid-operated circuit breaker, electrically operated and mechanically held, is announced for use with a variety of automatic controls for multiple-circuit, mixed-load service. Capacities are reported by the manufacturer, Lake Shore Electric Corp. to be 0-50 and 50-100 amp at 240V, 480V and 600V ac, 125 and 250V dc, with interrupting capacities rated at up to 10,000 amp rms. The compact unit, which occupies the area of only two average size circuit breakers, can be used for a variety of services including remote-operated breaker, limited-duty motor starter, remote, automatic lighting controls (all loads), remote control main service switch, automatic industrial battery charger cutoff, and heavy-duty contactor. The unit can be provided for either automatic or man-

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The AMOT SAFETY CONTROL SWITCH, Model 2340, illustrated above, is of such high quality and priced so low, that it is suitable for the protection of all Diesels, from the low priced high production models to the largest and most expensive custom built engines. It protects engines against high jacket water temperature and low oil pressure. Model 2340 A, without reset button, is priced at only \$30.00. Model 2340 B, illustrated, is \$33.50. Nowhere else can you get such positive protection for so long a time at such a low price. Write for Amot Bulletin No. 387.

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ual reset when the breaker is tripped due to overload or short circuit, the manufacturer points out. The solenoids which open and close the breaker are available for use with all voltages, ac or dc. The switch is thrown from open to closed position by momentarily energizing the proper solenoid. An interlocking latch and pivoting trip bar throws

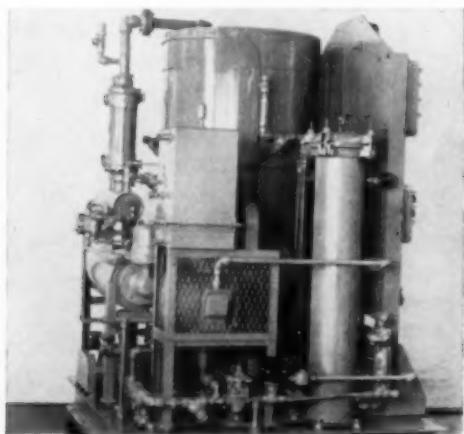


the breaker switch to the desired position. Heavy spring tension is employed for positive trip bar "latching". The switch may be used for maintained or momentary contact, 3 wire or 2 wire. The breaker is reported to be trip-free from external influence. In event of over-current or outage, an overload on any pole opens all poles so that possibility of single-phasing of polyphase motors is minimized. Silver contacts are employed for minimum resistance, and for maximum contact life. Parallel grid plates are employed in the arc quenchers, which are arranged so that arcs are confined and extinguished in less than 1/2 cycle. Remote-indicating lights can be provided to show switch position. Other special features include special trip characteristics and calibration; also special relay controls for integration with automatic systems. Further information may be obtained from Lake Shore Electric Corp., 205 Willis St., Bedford, Ohio.

ITS NEW

#### Engine Lube Oil Reclaimer

The Hilliard Corp. announces production of the 100-X Hilco Hyflow oil reclaimer. The unit is designed for the purification of diesel engine lubricating oil at a flow rate of 100 gph. Outstanding features include the use of all explosion proof



Front view of the reclaimer.

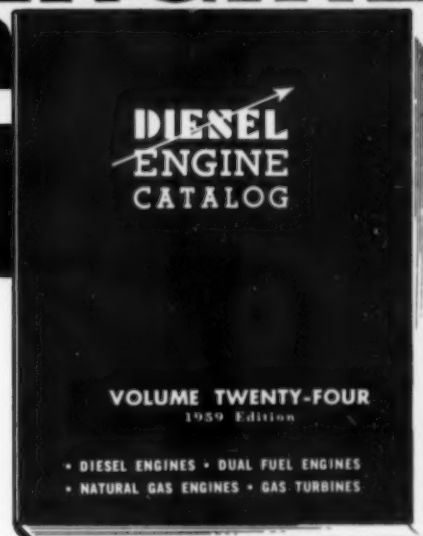
electric equipment, all steel construction, inlet fullers earth filter, an automatic draining distillate collection tank, and steam heated vacuum vaporization chamber with automatic steam heat controls. For further information contact the manufacturer at 122 W. 4th St., Elmira, N.Y.

ITS NEW

JUNE 1959

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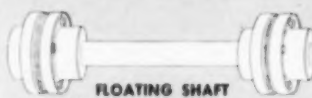
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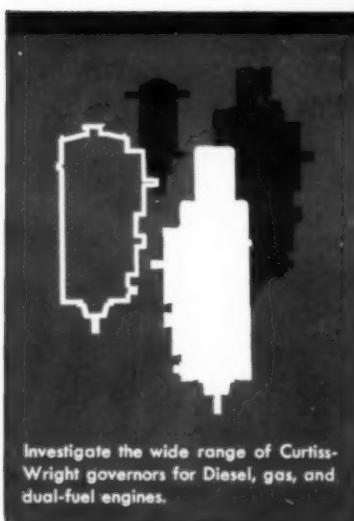
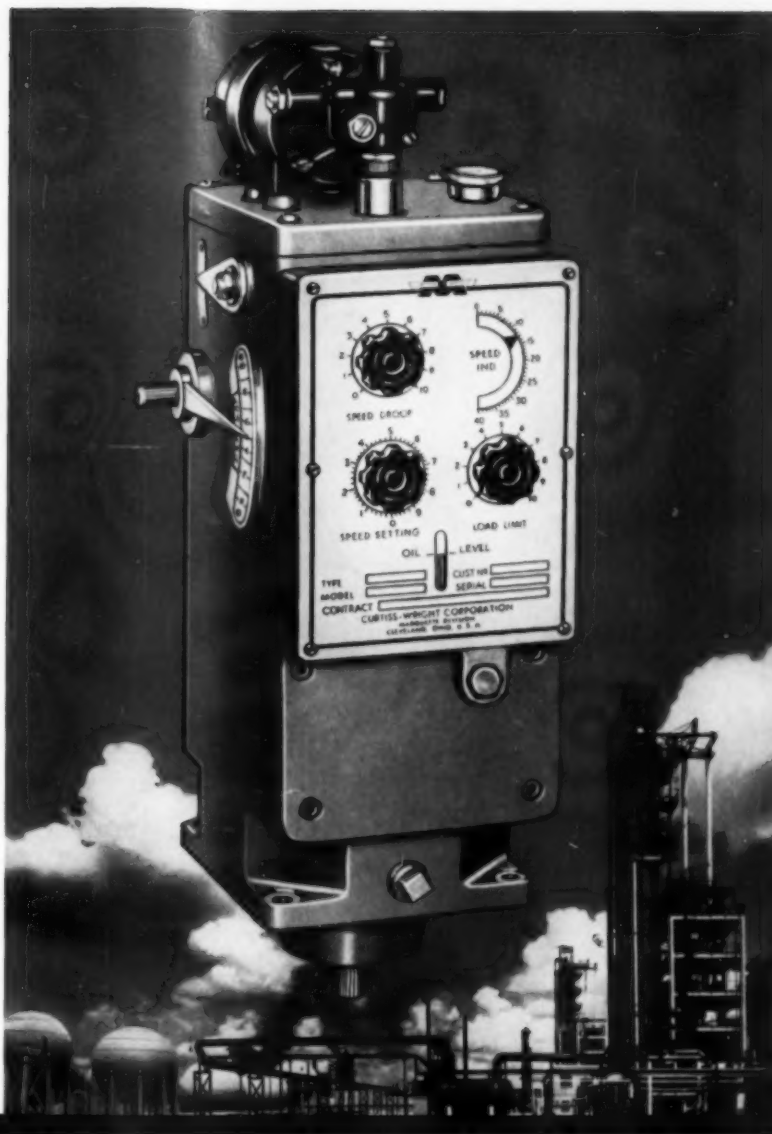
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